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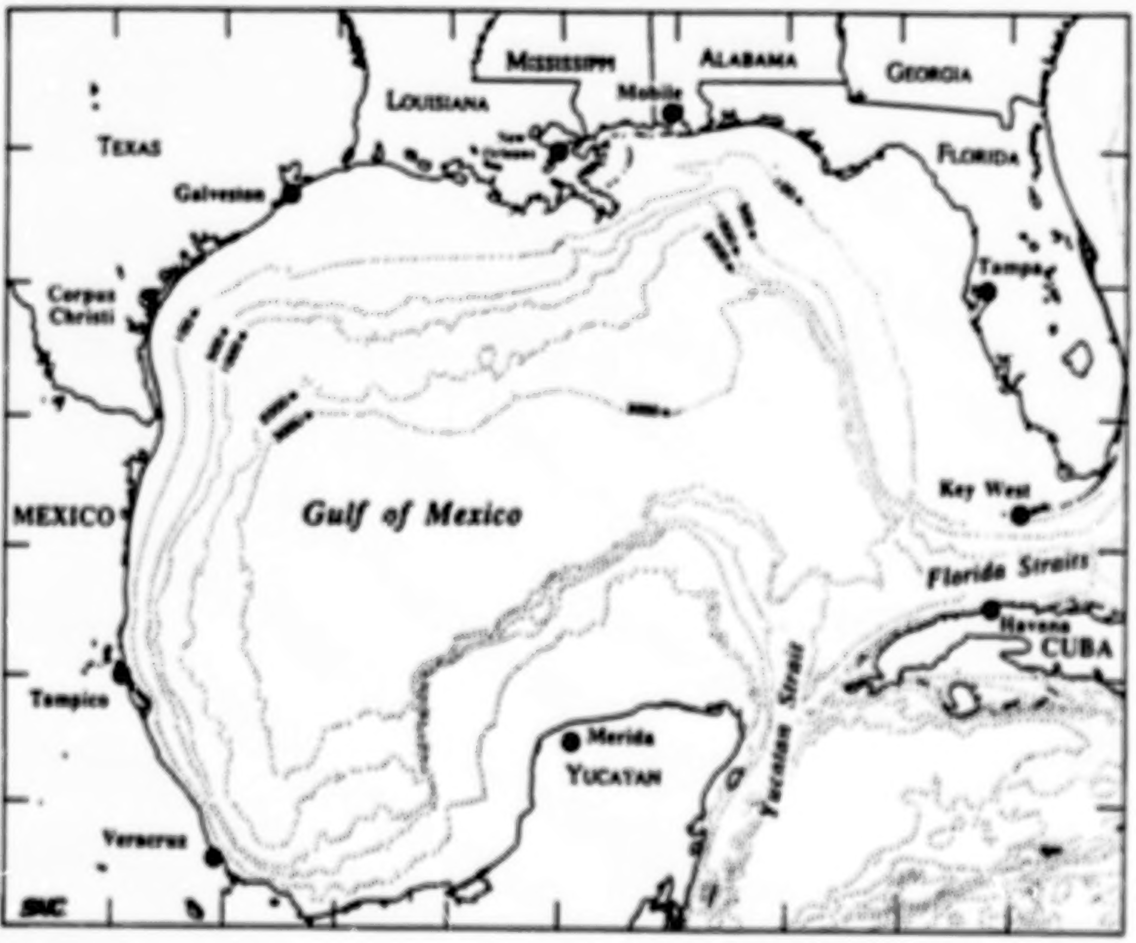
OCS Study
MMS 88-0074

Proceedings: Summer Ternary Gulf of Mexico Studies Meeting

July 1988



MMS
U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

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OCS Study
MMS 88-0074

Proceedings: Summer Ternary Gulf of Mexico Studies Meeting

July 1988

Author

Minerals Management Service

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Gulf of Mexico OCS Regional Office
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ABOUT THE COVER

Cover artwork is taken from the abstract of a paper given by Dr. Evans Waddell of Science Applications International Corporation. The paper was presented at the Summer Ternary Studies Meeting held on July 14, 1988, at the Holiday Inn, Pensacola, Florida. The figure is presented in its entirety on page 33 of this report.

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MEETING SUMMARY

Introduction

The Minerals Management Service (MMS), Gulf of Mexico OCS Regional Office, convened the second Ternary Meeting of 1988 on July 14th at the Holiday Inn in Pensacola, Florida. These public meetings are held as a forum for information exchange between interested and involved parties. This generally includes MMS personnel, representatives of various MMS-funded programs, state representatives, public interest groups, other Federal agencies, and invited investigators working on problems similar to or supportive of those of the MMS.

The meeting is a compilation of presentations given by several speakers. The speakers include both representatives of various MMS-funded studies, as well as invited guests. The purpose of each presentation is to provide information that defines each study's goals, schedule, methodology, present status, and any important or relevant insights recently developed. The meeting is planned so that ample opportunity for an exchange of information between speakers and audience is provided. In addition, a sufficient amount of unallocated time for discussion is also made available.

Meeting Agenda and Abstracts

The meeting's agenda is reproduced on page 3. Prior to the scheduled presentations, each speaker provides an abstract for distribution so that others have an opportunity to become familiar with the material to be presented. This procedure provides the audience an opportunity to formulate questions before each presentation is given and to attend each presentation with less distraction. These abstracts form the basis for this Meeting Summary Report.

Abstracts included in this volume are copies of those provided by each speaker. No adjustments have been made to the form and substance of these submissions.

Any questions regarding the presented material should be directed to the appropriate speaker. General questions regarding the Ternary Meeting or the Gulf of Mexico Environmental Studies Program should be directed to the Environmental Studies Section of the MMS Gulf of Mexico OCS Regional Office (504-736-2897).

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MINERALS MANAGEMENT SERVICE
GULF OF MEXICO OCS REGION
ENVIRONMENTAL STUDIES PROGRAM

AGENDA
SUMMER TERNARY MEETING

July 14, 1988

The Minerals Management Service (MMS), Gulf of Mexico OCS Regional Office, will hold an Environmental Studies Program Ternary Meeting on July 14, 1988. The meeting will take place in the Holiday Inn, 7200 Plantation Road, in Pensacola, Florida. Several MMS studies contractors will make progress presentations on recent results of their respective studies. You are cordially invited to attend this informal meeting. For additional information, you may contact Dr. Richard Defenbaugh, Chief, Environmental Studies Section (address below, Mail Stop LE-4; (504) 736-2896).

Preceding the Ternary Meeting on July 13, 1988, the Gulf of Mexico Regional Technical Working Group, an advisory body serving the MMS, will hold an open business meeting at the same location. Please contact Ms. Eileen Angelico (address below, Mail Stop ORD-5; (504) 736-2595) for further information.

TIME	SPEAKER	TOPIC
9:00 a.m.	Mr. J. Rogers Pearcy Minerals Management Service	Welcome
9:05 a.m.	** Dr. Chip Groat Louisiana Department of Natural Resources	Louisiana Marsh Management Study
9:30 a.m.	Dr. Karen Wicker Coastal Environments, Inc.	OCS Development and Potential Habitat Alterations
10:00 a.m.	Refreshment Break	
10:30 a.m.	Dr. Bruce Davis Jackson State University	Coastal and Environmental Analysis Using Geographic Information System
11:00 a.m.	Dr. Evans Waddell Science Applications International Corp.	Physical Oceanographic Measurements in the Northern Gulf of Mexico
11:30 a.m.	Lunch Break	
1:00 p.m.	*** Drs. James Brooks and Richard Rezak Texas A&M University	Mississippi/Alabama Shelf Marine Ecosystems Study
1:30 p.m.	Mr. Lawrence McKenzie Applied Technology Research Corporation	Socioeconomic Impacts of Declining OCS Oil and Gas Activities in the Gulf of Mexico
2:00 p.m.	Dr. Charles Giammona Texas A&M University	OCS Cultural Resource Management Zone 1 Re-evaluation
2:30 p.m.	Participants	Open Discussion

Minerals Management Service
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

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* A block of rooms has been reserved for meeting participants and attendees. The group rates are $44.00 (single) and $49.00 (double) plus a 9% tax. Be sure to mention the Minerals Management Service meetings when calling (904) 474-0100 for reservations in order to receive these rates. Reduced rates are guaranteed only until June 27, 1988. A map of Pensacola showing the location of the hotel is on the reverse side of this announcement.

**Presented by Dr. Don Cahoon

***Presented by Dr. Charles P. Giammona

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ABSTRACT

A STUDY OF WETLANDS MITIGATION: MARSH MANAGEMENT

Second 1988
MMS Ternary Studies Meeting
July 14, 1988
Pensacola, Florida

Submitted to: Minerals Management Service
Gulf of Mexico OCS Regional Office
Environmental Studies Section

Submitted by: Dr. Charles G. Groat
Louisiana Geological Survey
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Baton Rouge, LA 70893

Presented by: Dr. Don Cahoon
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A STUDY OF WETLANDS MITIGATION: MARSH MANAGEMENT

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Director
Louisiana Geological Survey
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ABSTRACT

INTRODUCTION

A Wetlands Mitigation Study is being undertaken for the Minerals Management Service by the Louisiana Department of Natural Resources through the offices of the Louisiana Geological Survey and the Coastal Management Division. The primary focus of this study is to determine the most efficient marsh management techniques for a wide array of environmental conditions in coastal Louisiana. This is being done through a comprehensive evaluation of coastal marsh environments and an examination of specific sites in a variety of physiographic settings. The study will address the administrative concerns of marsh management (i.e., legal and policy framework), conduct a basic inventory of activities associated with marsh management, develop and implement a marsh management monitoring program, perform a biological analysis of marsh management activities, evaluate design features and construction techniques used in marsh management, and prepare a suitability analysis based on site characteristics and management objectives.

PROJECT ADMINISTRATION

The Cooperative Agreement was awarded and the project commenced on March 31, 1988. The first three months of the study have been devoted to project design and methodology development, organizing personnel, establishing an ad hoc advisory panel called the Technical Steering Committee, developing a monitoring strategy, identifying data sources, and acquiring and analyzing data.

The Technical Steering Committee (TSC) consists of representatives from federal and state agencies (COE, EPA, USFWS, NMFS, SCS, La. DWF), private landowners (Vermilion Corporation and Tenneco-Laterre), and university researchers (LSU). The TSC serves as an advisory body to all project tasks, reviews findings and draft reports, and assists in planning the field monitoring study. The first meeting of the TSC was held on June 1, 1988 in Baton Rouge, LA. Development of a monitoring strategy was commenced and will be continued at the next scheduled meeting on July 22, 1988.

The U. S. Environmental Protection Agency has offered additional financial support for the development of the monitoring strategy. The EPA will provide support for photointerpretation and computer mapping efforts. We are grateful to Mr. Norman Thomas of the Region VI office for his cooperation and support in this endeavor.

PROJECT DESIGN AND METHODOLOGY DEVELOPMENT

With the assistance of the TSC, we will complete development of a monitoring program by the fourth month of the project. The program will consist of two parts: (1) a review of permittee-generated monitoring data; and, (2) collection and analysis of field samples and measurements at selected managed and control sites. As an initial step, we have developed a working definition of marsh management:

"For the purpose of this study, marsh management is defined as the use of structures to manipulate local hydrology for the purpose of reducing or reversing wetland loss and/or enhancing productivity of natural renewable resources."

Within the context of this definition, development of the monitoring program is proceeding in an orderly fashion, beginning with: (1) identifying issues and objectives; (2) developing criteria for selecting sites; (3) selecting sites; and, (4) developing a strategy for the field work. As a result of the first meeting with the TSC, we have preliminarily identified issues and criteria for site selection (see attachments), and reviewed more than fifty marsh management plans as potential field sites. At the next scheduled meeting, we will prioritize the issues and site selection criteria, select sites, and discuss field sampling strategies.

PROJECT ACCOMPLISHMENTS

The legal framework for marsh management in coastal Louisiana is being examined to: (1) determine how marsh management practices fit within federal and Louisiana regulatory schemes; (2) identify problems and conflicts that may exist in the law; and, (3) help guide prospective marsh managers through the regulatory maze. The preliminary results of this review were presented at the "Marsh Management In Coastal Louisiana: Effects and Issues Conference" held in Baton Rouge, Louisiana on June 7-9, 1988. A review of the public interest goals of marsh management is ongoing.

As the first step of our basic inventory of activities, we have reviewed over 300 secondary literature sources for the development of an annotated bibliography. More than 50 of these sources deal directly with structural marsh management. The bibliography will be computerized with a retrieval code that allows users to access citations by state, basin, marsh type, management orientation, variable (e.g., ducks, aquatic vegetation), and source.

A general study area map showing permitted marsh management projects has been generated by computer. Since 1980, over 120 permit applications for marsh management projects have been received by the DNR Coastal Management Division. These plans involve the management of 460,000 acres (7.4%) of the 6.2 million acre coastal zone. They range in size from 0.3 acres to 68,445 acres with a mean of 4,133 acres per plan. The management plan boundaries and structural components were plotted on 1:24,000 USGS quadrangle maps and digitized into the CMD Geographic Information System. The final atlas map was plotted on a coastal zone overlay at a scale of 1:750,000. Non-permitted management areas and those on federal and state refuges will be added to the Atlas in the future. The digitized data will be transferred to MOSS or ERDAS database so as to calculate changes in habitat and landloss for areas presently under management.

An environmental characterization of the Louisiana coastal zone is being developed from: (1) computerized habitat descriptions and maps; and, (2) a description of hydrologic and geologic conditions in each hydrologic basin. For this purpose, 27 data sets have been identified. Acquisition and analysis of these data sources is ongoing.

Categories of Issues

I. Landscape Changes
  1. Land:Water Ratio
  2. Vegetative Community Changes

II. Ecological Processes

  A. Hydrology
    1. Water level - Frequency & Duration of inundation
    2. Circulation patterns
    3. Import/export of sediments and organic matter
    4. Sediment dispersal and accretion
    5. Saltwater intrusion
    6. Erosion processes
    7. Nutrient cycling

  B. Biology
    1. Vegetative colonization
    2. Community succession
    3. Species diversity, dominance, composition
    4. 1^{o} production
    5. 2^{o} production
    6. Decomposition of organic matter

  C. Edaphic/Geologic
    1. Subsidence
    2. Soil Biogeochemistry and soil structure

III. Habitat Quality
  1. Structural diversity
  2. Water quality
  3. Estuarine organism access

IV. Cumulative Impacts
  1. Effects outside plan
  2. Effects of many MMP
  3. Abandonment

V. Management Approach
  1. TRIAGE
  2. "No net loss of wetlands"
  3. Regulation
  4. Mitigation
  5. Goals

CRITERIA FOR SITE SELECTION

LOCATION

Geographic Province (Deltaic and Chenier Plain)

Hydrologic Basin

Marsh Type

MANAGEMENT

Type (active vs passive)

Degree of Implementation

Degree of Maintenance

Degree of Monitoring History

Size

HABITAT QUALITY

Degree of Environmental Degradation

Appropriate control area

ABSTRACT

IMPACTS OF THE OUTER CONTINENTAL SHELF RELATED ACTIVITIES ON SENSITIVE COASTAL HABITATS

Second 1988
MMS Ternary Studies Meeting
July 14, 1988
Pensacola, Florida

Submitted to: Minerals Management Service
Gulf of Mexico OCS Regional Office
Environmental Studies Section

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ABSTRACT

IMPACTS OF THE OUTER CONTINENTAL SHELF (OCS) RELATED ACTIVITIES ON SENSITIVE COASTAL HABITATS

MMS CONTRACT NO. 14-12-0001-30325

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The study of impacts of OCS related activities on sensitive coastal habitats has concentrated on identifying, describing and quantifying the types of impacts these activities have had on sensitive coastal habitats located between Cameron County, Texas and Bay County, Florida. The related activities include OCS pipelines, navigation channels, facilities and produced water discharges. Researchers with CEI investigated the first three activities while LUMCON directed the study of produced water discharges.

The geographical areas of impact included the beach zone on barrier shorelines, the entire barrier island complex, including submerged aquatics, and all coastal marshes.

Preliminary analyses of the data indicate that the types and extent of impacts for pipelines are dependent upon the type of construction technique utilized, i.e., flotation canal or push-pull ditch, including closure procedures, and the environmental forms and processes present at the site. Construction and maintenance of OCS navigation channels, including jetties, affect the forms and processes of the shore/near-shore environment and create corridors of continuous erosion along the channel.

With regard to produced water discharges, it was found that the amount of produced water discharge was greater than previously estimated. Furthermore, the discharged waters contain elevated levels of dissolved and dispersed petroleum hydrocarbons, organic acids and trace metals.

This study has two major objectives. The first objective is to document present impacts of pipelines, navigation channels, facilities, and produced waters. The second objective is to predict future impacts of the first three of these activities primarily in areas affected by frontier exploration and production, i.e. coastal Mississippi, Alabama and Florida. These states do not permit discharges of produced waters.

In order to achieve part of this first objective, OCS activities and impacts were identified and analyzed in relation to the physical, biological, and cultural parameters of the site of potential impact and the characteristics of the individual activities, primarily construction and mitigation conditions. Pipelines, navigation channels and facilities were identified and mapped on 1:250,000 and 1:24,000 USGS topographic maps. Interpretation of aerial photographs and habitat maps facilitated documentation of pipeline and navigation channel impacts by providing comparisons of initial and present-day feature characteristics such as size, configuration, appearance, habitat type, and shoreline change. This latter task involved documenting changes along the pipeline and channel right-of-way (ROW) and control transects right and left of the ROW.

In order to put the quantifiable impact characteristics of the OCS activities into perspective and to predict future impacts, the characteristics of the entire study area were identified and

mapped at a scale of 1:250,000. The Atlas included the following plate series: 1) location map with OCS pipelines and facilities; 2) land use and navigation channels; 3) cultural resources; 4) vegetation, precipitation, surplus, and hydrology; 5) shoreline type, depth to Pleistocene, and sediment transport; 6) geomorphology and shoreline change; and 7) nearshore energy levels.

To verify aerial-photo and habitat map interpretations, numerous pipelines were field checked. Further, two to three pipelines from each coastal system (i.e., Texas Barrier Islands, Strand-Chenier Plain, Mississippi Deltaic Plain and North Central Gulf Coast) and two navigation channels were selected for field investigations. Along the pipeline ROW and at control points, vibracores were taken and vegetation and hydrographic parameters were sampled in order to document any differences that may indicate impacts.

The second major objective of this research effort was to utilize the information generated from this and previous studies to predict, with the intent of mitigating, the impact of future OCS related activities which are expected to occur as frontier areas of the OCS are developed. As part of this prediction process, the present Federal and state regulations pertaining to these activities were documented. A summary and comparison of these conditions which govern emplacement of pipelines detail the impacts which are of most concern and which must be mitigated or prohibited. Table 1 is an example of guidelines which the Gulf coast states utilize when reviewing permit requests for pipelines.

The produced water study, while being a component of the first major objective of this study, was researched independently of the pipeline-navigation channel-facility impact study. It was formulated to be a preliminary study to: 1) quantify the location and characteristics of OCS-produced waters discharged into coastal environments of the Gulf of Mexico, and 2) provide an assessment of the environmental fate and effects of selected discharges. An inventory of produced water discharges based on records of regulatory agencies in Texas and Louisiana was compiled. The other Gulf states (Mississippi, Alabama and Florida) do not permit the discharge of produced water into surface waters. A field assessment provided a general delimitation of the scope and nature of the impacts.

A draft report of this study has been completed and results are being reviewed. The total emissions of produced water into estuarine, coastal and continental shelf environments in the Gulf of Mexico region may be 3.4 million barrels per day, a rate considerably greater than previous estimates. Approximately 70% of these discharges enter the estuarine systems of Louisiana and Texas. The distribution of these discharges is widespread throughout the coastal zones of both states, but produced water discharges are more numerous and voluminous in southeastern Louisiana and on the upper Texas coast. Of the produced waters generated on the OCS, 38% are piped ashore for separation and disposal in Louisiana coastal waters. Furthermore, approximately 23% of produced water discharged into Louisiana coastal and estuarine waters emanates from the OCS.

Three sites representing large volumes of OCS-generated produced water discharges and different hydrological conditions were selected for field assessments: Bayou Rigaud, behind Grand Isle; Pass Fourchon; and the bay side of East Timbalier Island. There is no significant effect of elevated salinity resulting from the coastal discharges of OCS produced waters, because the separation facilities are located close to the coast. The discharged produced water sinks to the bottom because of its high density, and the rate of its dispersion depends on tidal currents. The discharged produced waters contain elevated levels of dissolved and dispersed petroleum hydrocarbons, organic acids and trace metals. Concentrations of the organic constituents may depend on the separation and treatment technologies employed. Substantial contamination of fine-grained bottom sediments with petroleum hydrocarbons in sediments exceeded apparent background levels by over an

Table 1. Guidelines for Construction of Pipelines in Gulf Coast States

	GUIDELINES	TEXAS	LOUISIANA	MISSISSIPPI	ALABAMA	FLORIDA
1	Bury Pipeline Below Gulf Inlet, River or Stream Crossing at Least to Federal Standards (-48" in soil and -24" in consolidated rock under rivers, streams, and harbors; -36" in soil and -18" in consolidated rock in offshore locations less than 12 feet deep)	* (-24")	* (-48") (-36")	*	* (-24")	*
2	Evenly Backfill Trenches to Reasonably Conform to Surrounding Area's Bottom Profile	*	*	*	*	-
3	Take Erosion Prevention Measures at Shoreline	*	+	+	*	*
4	Double Ditching Will be Encouraged	-	-	*	-	-
5	Use "Push Ditch" Method and Backfill or Method that does not Degrade Wetlands	-	*	*	*	*
6	Revegetate Disturbed Wetlands	-	+	*	*	*
7	Plug and Maintain Plug at all Waterway Crossings Where Non-Navigation Canals, Channels, Ditches Connect More Saline Areas with Fresher Areas	-	*	+	-	-
8	Select ROW to Avoid Shell Reefs, Submerged Grassbeds, and Marshes	+	+	+	+	+
9	Avoid or Minimize Damages to Important Spawning Nesting, Nursery or Rearing Areas	-	*	*	*	-
10	Avoid Adverse Impacts on Areas of High Biological Productivity or Irreplaceable Resource Areas	-	*	-	*	*
11	Utilize Procedures to Protect Sea Turtles and Their Nests Between May 1 and Oct. 30	-	-	-	-	*
12	Use Existing Corridors, ROWs, Canals and Streams	-	+	+	-	-
13	Permanent Blockage of Surface Drainage is Prohibited	-	-	*	-	-
14	Avoid or Minimize Clearing of Natural Vegetation from River or Stream Banks, so that a Screen of Natural Vegetation is Left in the ROW	*	-	-	*	-
15	Dredging Shall Not Traverse Barrier Islands (Nor Adversely affect Barrier Islands)	-	*	*	*	-
16	If Beach, Tidal Pass, Reef or other Natural Gulf Shoreline Must be Traversed, it Must be Restored Immediately Upon Completion of Construction	-	*	-	*	*

*	Always Required
+	Required to Maximum extent Feasible/Practicable
-	Not Specifically Noted

order of magnitude. Sediments which show evidence of hydrocarbon contamination from produced water discharges extend several hundred meters to over one kilometer from the point of discharge. The effect is more extensive than reported for other produced water discharges which have been studied because of the lower physical dispersion in the bayous and canals into which the discharges take place and the larger volumes of produced water discharged. General surveys at the three sites showed evidence of biological effects in terms of reduced density and diversity of macrobenthic organisms in contaminated sediments and the accumulation of petroleum hydrocarbons in the tissues of the filter feeding bivalves proximate to the discharge sites. Quantification of these effects awaits more rigorous field and laboratory studies.

CEI is presently synthesizing the field and map/photo-generated data in order to develop conclusions regarding the type and degree of impact associated with OCS pipelines and navigation channels. Several preliminary conclusions are evident at this time.

The majority (57%) of OCS pipelines make landfall in the Mississippi Deltaic Plain system but only 27% cross or touch barrier island complexes and beaches (Figure 1). The majority (64%) of the OCS pipelines are identified as gas transporters (Figure 2).

Pipelines ranging in size from 4 in to 20 in constitute 77% of the OCS pipelines. The largest OCS pipeline is 42 in (Figure 3). There are 16 OCS pipelines in Texas with 10 of these making landfall in the Texas Barrier Island System (Figure 4). Of the 142 OCS pipelines in Louisiana, 49 make landfall in the Chenier Plain system. There are only two OCS pipelines making landfall in the North Central Gulf Coast System. However, eleven pipelines were studied for this region in order to evaluate past pipeline impacts and predict future impacts in this area. At least one pipeline has made landfall within some section of the Gulf Coast every year between 1954 and 1986.

Analysis of 169 pipelines indicate that the types and extent of impacts vary depending primarily upon the construction technique. For example, a push-pull ditch whether left open or backfilled disturbs less of the original habitat than a flotation canal. Figures 5 and 6 illustrate changes in habitat type along a typical flotation and push-pull canal over a 30 year period. Figure 7 illustrates cross-sectional differences in these two canal types. It must be further noted that environmental conditions are also a major influence on the severity of the long term impact, and that certain environmental characteristics can, with time, obscure a pipeline's presence on the landscape. Conversely, other environmental characteristics can exacerbate even the best mitigated techniques.

Along beaches with sufficient sediment supply and no large backbay areas behind the landfall sites, the pipeline, whether flotation canal or push point cut, seals itself relatively rapidly. This is quite apparent from a comparison of 1978 and 1985 aerial photographs of pipelines in the Chenier Plain system of Louisiana.

All OCS pipelines constructed in Texas appear to have been done in such a manner, i.e., trench, backfill and/or recontoured and revegetated, as to have little or no long-term observable impact. Some pipeline sites are impossible to locate on aerial photography, while others are visible only as a faintly visible, linear scars on the vegetation community. The combination of environmental site characteristics and construction techniques are responsible for this lack of apparent impact.

A directionaly drilled pipeline does not impact the beach zone because there is no canal dredged through the beach. Initial drilling behind the dunes may impact the vegetation communities because of construction activities associated with drilling but such sites appear to heal rapidly.

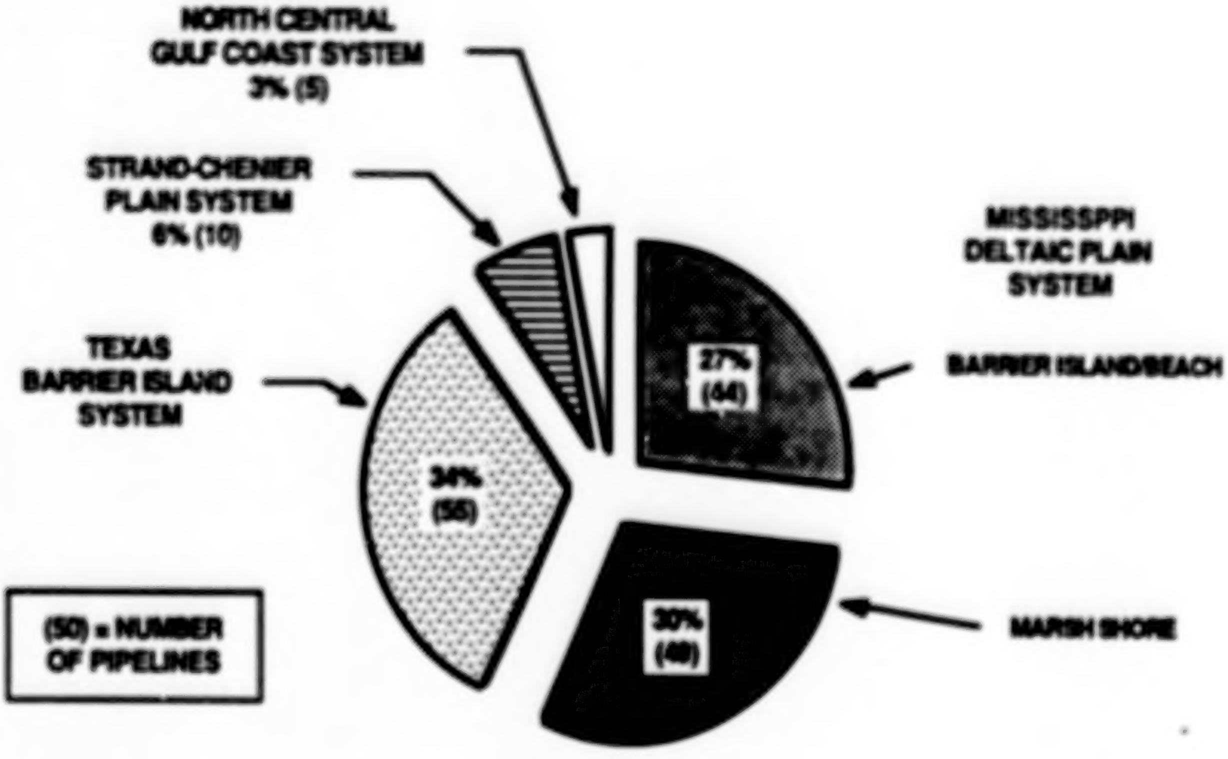

Figure 1. Distribution of OCS pipeline landfalls by Gulf Coast System.

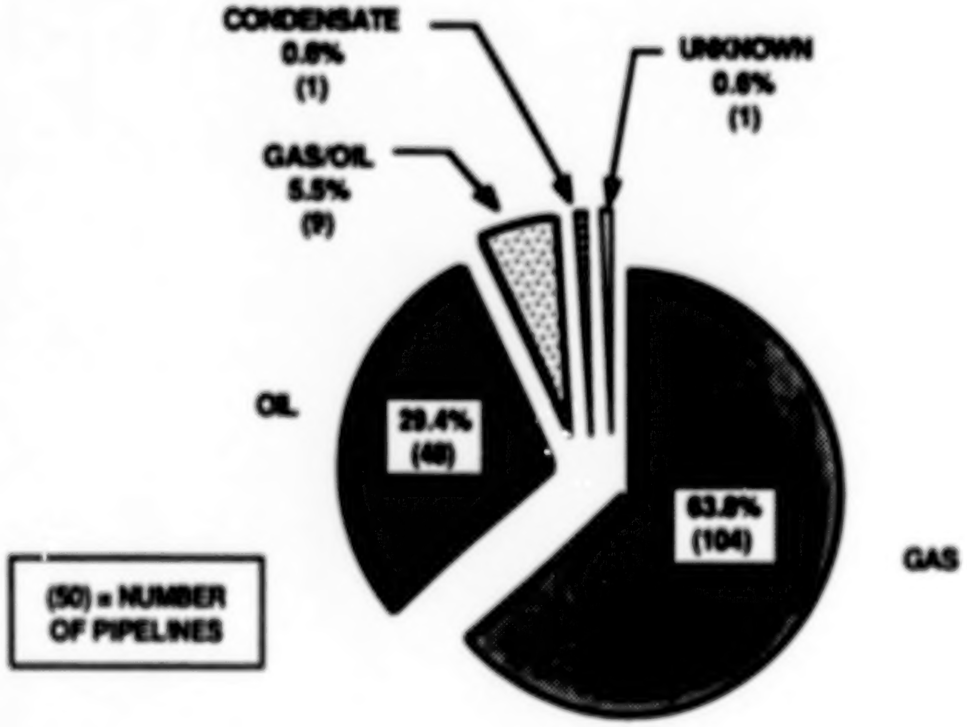

Figure 2. Contents of OCS pipelines.

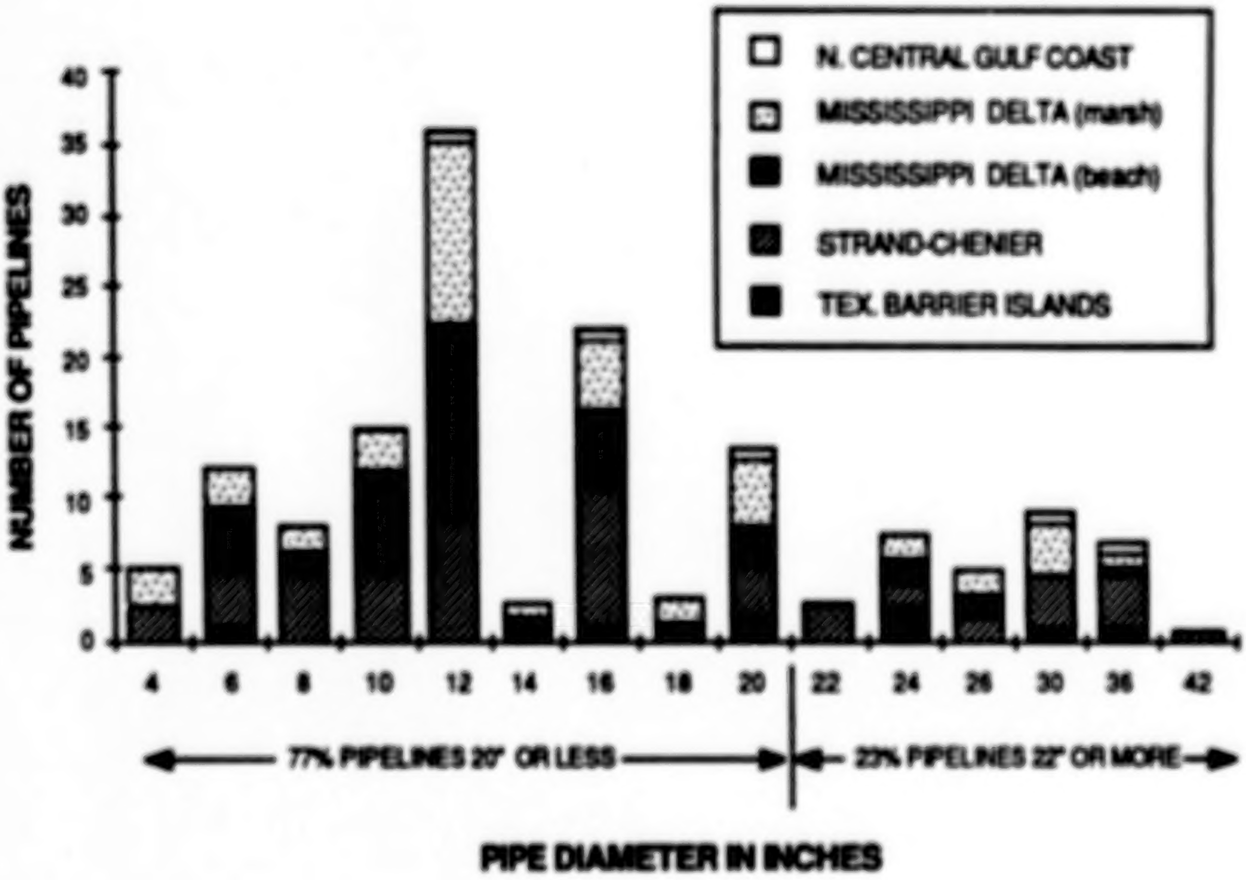

Figure 3. Distribution of OCS pipelines by size.

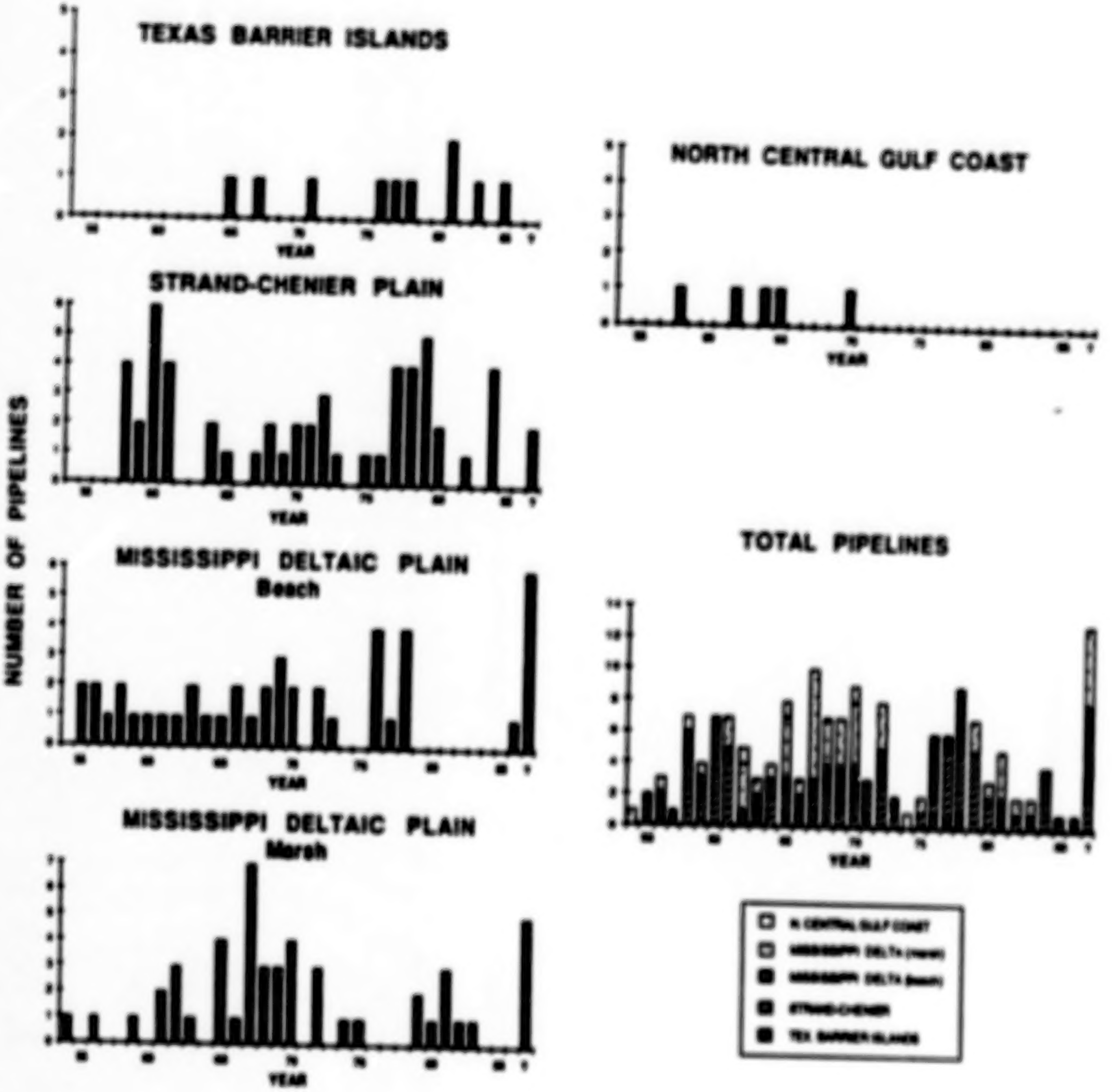

Figure 4. Distribution of OCS pipelines by date of construction and coastal system.

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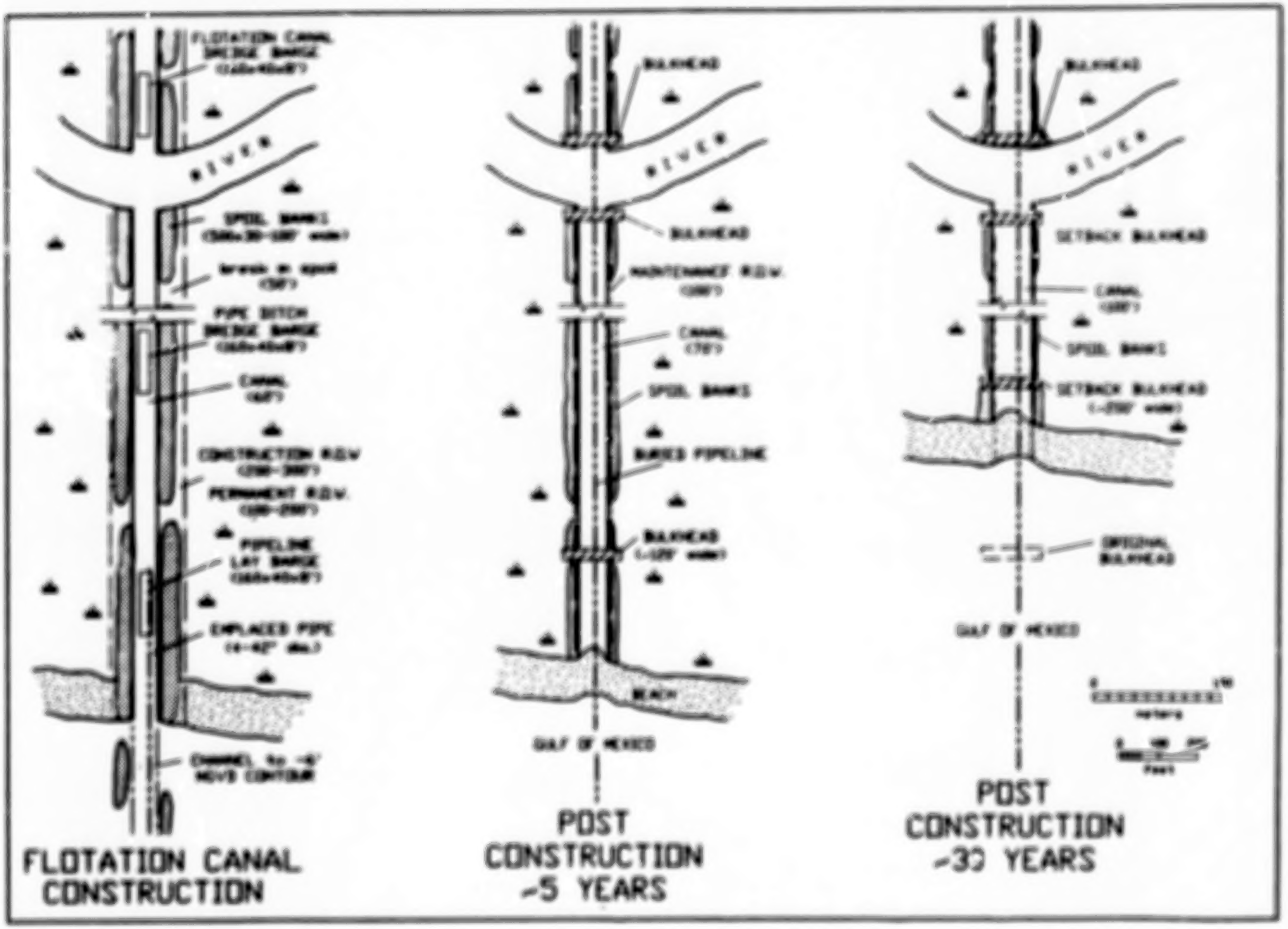


Figure 5. Comparison of change along a typical flotation canal over a 30-year period.

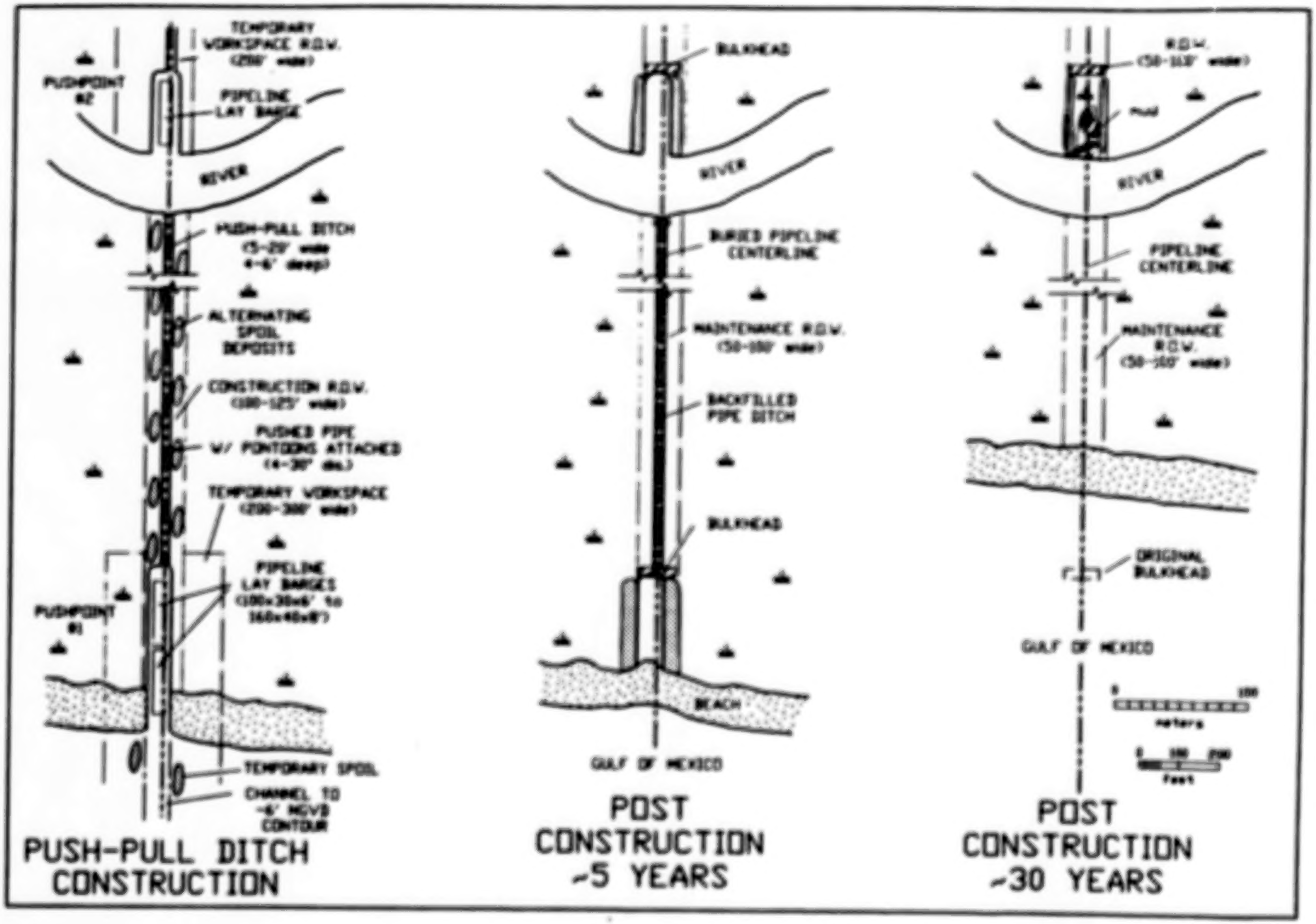
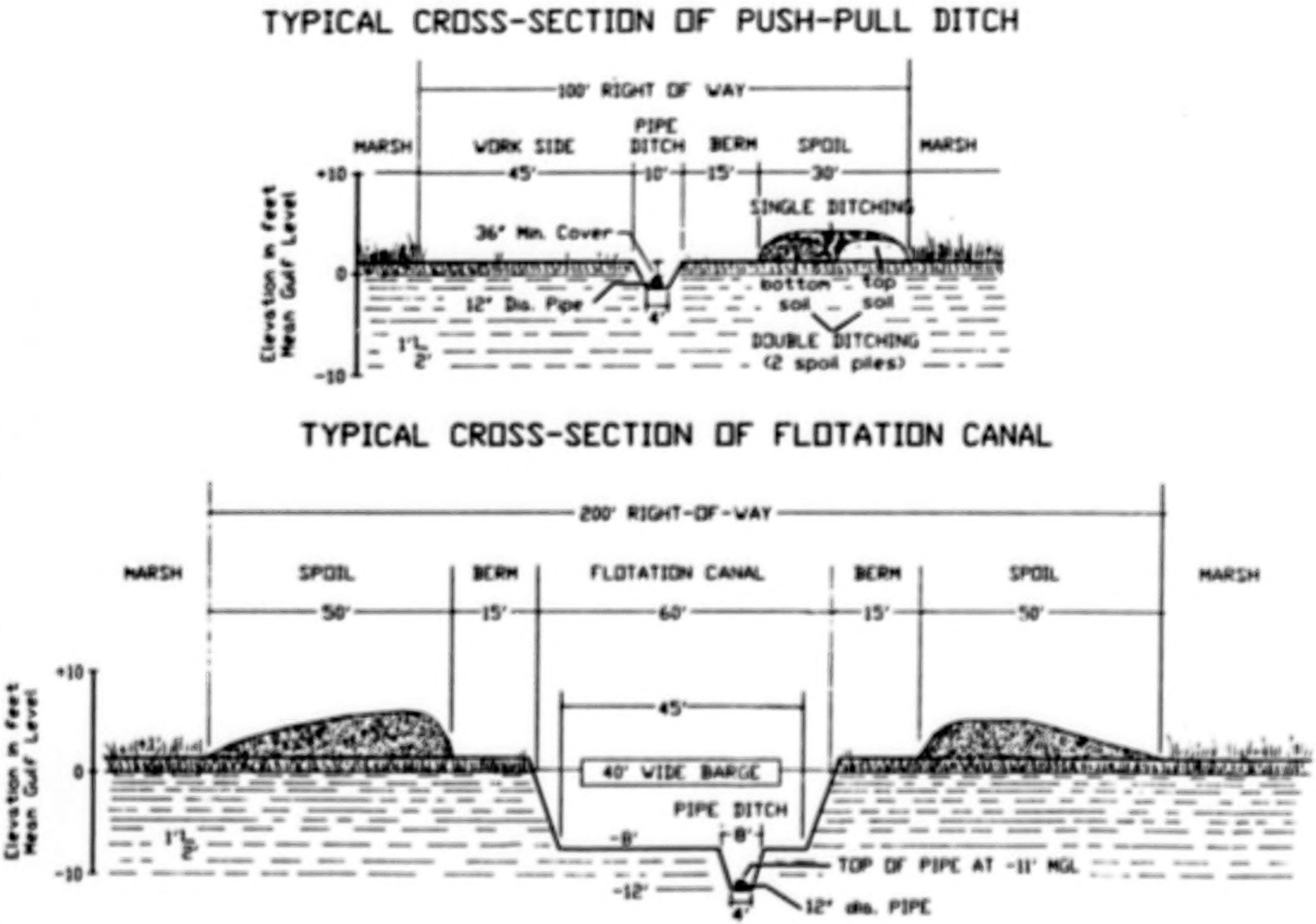

TEMPORARY WORKSPACE R.O.W. (200' wide)
PUSHPOINT #2
PIPELINE LAY BARGE
RIVER
PUSH-PULL DITCH (5-20' wide 4-6' deep)
ALTERNATING SPOIL DEPOSITS
CONSTRUCTION R.O.W. (100-125' wide)
PUSHED PIPE W/ PONTOONS ATTACHED (4-30" dia.)
TEMPORARY WORKSPACE (200-300' wide)
PIPELINE LAY BARGES (100x30x6' to 160x40x8')
PUSHPOINT #1
TEMPORARY SPOIL
CHANNEL TO -6' NGVD CONTOUR
PUSH-PULL DITCH CONSTRUCTION
BULKHEAD
RIVER
BURIED PIPELINE CENTERLINE
MAINTENANCE R.O.W. (50-100' wide)
BACKFILLED PIPE DITCH
BULKHEAD
BEACH
GULF OF MEXICO
POST CONSTRUCTION ~5 YEARS
R.O.W. (50-100' wide)
mud
RIVER
PIPELINE CENTERLINE
MAINTENANCE R.O.W. (50-100' wide)
ORIGINAL BULKHEAD
GULF OF MEXICO
0
100
meters
0
100
200
feet
POST CONSTRUCTION ~30 YEARS

Figure 6. Comparison of change along a typical push-pull ditch over a 30-year period.


TYPICAL CROSS-SECTION OF PUSH-PULL DITCH

TYPICAL CROSS-SECTION OF FLOTATION CANAL

Figure 7. Comparison of typical cross-sections for a push-pull ditch and flotation canal.

The removal of pipeline scars and lessening of long-term impacts on marshes is most successful when the pipeline right-of-way is returned to its pre-construction contour. Pipeline industry sponsored studies indicate that such sites are well on their way to a revegetated recovery within two years.

A complete itemization of impacts and conclusions regarding the relationship of impacts to construction techniques and environmental site characteristics will be included in the final report.

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ABSTRACT

COASTAL AND ENVIRONMENTAL ANALYSIS USING GEOGRAPHIC INFORMATION SYSTEMS

Second 1988
MMS Ternary Studies Meeting
July 14, 1988
Pensacola, Florida

Submitted to: Minerals Management Service
Gulf of Mexico OCS Regional Office
Environmental Studies Section

Submitted by: Dr. Bruce Davis
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Jackson, MS 39205

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COASTAL AND ENVIRONMENTAL ANALYSIS
USING GEOGRAPHIC INFORMATION SYSTEMS

Bruce Davis, Director
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The Center for Spatial Data Research and Applications at Jackson State University, Jackson, Mississippi, is assisting the Minerals Management Service in developing GIS (Geographical Information Systems) as an effective and valuable tool for Gulf of Mexico environmental data base construction and analysis. Working under a multi-year grant, we have established the Center as a GIS and remote sensing lab and have begun work on several preliminary projects. Major equipment and software have arrived recently and are in the initial stages of operation. Central to the undertaking is a Vax-based Arc-Info GIS, a powerful mapping graphics program integrated with a relational database. Other major hardware includes a Tektronix 4125 intelligent workstation, a Tektronix 4115 workstation, Calcomp 9100 60-inch backlit digitizing table, Calcomp 44-inch color electrostatic plotter, two Tektronix 4696 color ink jet printers, and a host of other support equipment and software. The Center is now in operation and solicits participation from other MMS offices and projects.

Three preliminary projects are underway:

1. Conversion of MMS digital tapes of lease block data (geographic and statistical) from Perkin-Elmer configuration to Vax Arc-Info (and return). Tapes have been converted and graphic output is in progress. It is expected that complete maps, at various scales and formats, will be produced within the next month. Standards for subsequent conversions are being established.

2. Mapping of live bottom siten in the Gulf of Mexico: As a demonstration of basic capabilities and to initiate an environmental data base for the region, live bottom sites are to be digitized, entered into an inventory data base, and mapped at various scales and formats. Procedures have been established and we are awaiting stable base hard copy data from MMS.

3. Construction of a Base Map Atlas: To accommodate a variety of needs, from very small to very large scale projects, a set of base maps is under construction. Because of the range of MMS research interests, from localized phenomena to Gulf-wide mapping, a single "base map" for data entry and display is not

practical. We have organized a set of scales and accuracy standards to guide investigators in input and output formats. An "atlas" of coverages is under production, ranging from a 1:5,000,000 Gulf map to examples of 1:1,000 charts. Examples of output will also be shown--general reference maps, thematic maps, statistical results, overlays, corridor analysis, etc.

A capability demonstration is presented at the Pensacola meeting. Using NOAA Gulf of Mexico Coastal and Ocean Zones Strategic Assessment: Data Atlas, several inventory and analytical maps have been produced to show basic Arc-Info mapping, data base, and GIS analytical abilities of Arc-Info.

Several future projects are under consideration. Mapping of offshore structures can be useful. Arc-Info is well-suited for managing data from a diversity of sources, scales, and configurations. All data are integrated into a common data base, from which subsequent analysis and mapping can be produced. Mosaicking and analysis of block surveys may be undertaken, also. Using post-lease environmental surveys, detailed information can be integrated regionally, providing a synoptic view of high resolution data.

Several JSU projects are being contemplated. Further application of the NOAA GOM Atlas could reveal large regional patterns of associations. Although data are highly generalized and subject to questionable localized interpretation, overlay of multiple maps, particularly using themes normally unassociated, could generate new and interesting information. Employment of numerous GIS and spatial analysis manipulations to the analysis of an assortment of pairings can demonstrate the full utility of GIS.

Some JSU faculty and graduate students have interests in monthly spatial distribution cycles of various marine species, especially as they relate to environmental influences, such as temperature changes, river depositions and turbidity, etc. Several pilot projects are under discussion. The impact of TED to shrimp productivity, in terms of population density and distribution, may be investigated. Habitat changes throughout the year and their effect on shrimp population could be incorporated into these studies.

The JSU-MMS program is to expand to the Alaska and Pacific regions in the second year and talks with Alaskan MMS personnel have begun. Because they are using Arc-Info, also, there will be few problems of data compatibility.

ABSTRACT

PHYSICAL OCEANOGRAPHIC MEASUREMENTS IN THE NORTHERN GULF OF MEXICO

Second 1988
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Submitted to: Minerals Management Service
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Environmental Studies Section

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ABSTRACT

Year 5 of the MMS-funded, Gulf of Mexico, Physical Oceanography Program is to provide an improved understanding of circulation patterns and processes on the shelf, slope and in deep regions in the north central Gulf (Figure 1). A full suite of environmental measurements are being made, including:

- Subsurface currents/temperatures/pressure/transmissivity
- Ship- and plane-based hydrographic surveys
- Satellite-tracked surface drifters
- Satellite thermal imagery (AVHRR)
- Ship-of-Opportunity (SOOP) transects

Measurements are to continue for approximately three more months until November, 1988.

During July and August several key surveys will be conducted. A shelf mooring rotation/marine optics cruise will occur during the third week of July. Soon after that, an AXBT survey will be made of a major Loop Current eddy in the central Gulf. Within space and time constraints stations on this latter survey will be selected to also coincide with portions of ephemeris tracklines for the GEOSAT altimeter. The resulting data set will not only characterize the eddy temperature field but will also provide estimates of the density contribution to the sea surface elevation along the trackline. Removal of this component will allow an improved estimation of the geoid and hence the absolute elevation of the sea surface along the surveyed trackline.

As a cooperative effort, Dr. Victor Vidal of the Electrical Institute of Mexico is conducting a ship-based survey of the southern half of the Gulf of Mexico, i.e. south of 26°N during late June and the first half of July, 1988. XBT data taken during this cruise will be provided to this MMS study. This cooperation has provided valuable data during several previous cruises.

In the past six months, several eddies have separated from the Loop Current. The number of eddies present in central and western Gulf is not well known, however indications are that there may have been as many as four at one time. At present, two eddies are well documented with drifting buoys which were released soon after each eddy separated from the Loop Current. Historical thermal imagery is being obtained to present jointly with the drifter trajectories. Examinations of such coincident data have shown this to be an valuable method of resolving circulation patterns in the Gulf.

Recent buoys and buoys released during Year 3 of the present program have followed quite similar paths. Of particular interest is the pattern of trajectories followed by Buoy 3378 (Figure 2) and Buoy 3353 (Figure 3) as it moved westward. The "tight" closed orbits occur at the same location and the buoy center was moving in the same west southwest direction. Note the general northward track of the buoys during recent years. These were compared with older trajectories and the plot of eddy centers shown in Figure 4.

Examination of satellite imagery illustrates the complex nature of estuarine-shelf interaction, shelf circulation and shelf-slope exchange in the NW Gulf. Seasonal surface warming and cooling seems to be most rapid in the vicinity of

primary estuarine discharge (Atchafalaya and Mississippi Rivers). Temperature bands are often not concentric with either the coast or the shelf break. Alternating "fingers" of warm and cool water occur alongshore. Inner shelf water which appears linked to estuaries can be seen extending across and off the shelf. Off of the east and south Texas coast jets of generally cooler water are often extended far over the slope. The few times these latter "jets" have been measured in the field they have been associated with Loop Current eddies in the western and north western Gulf.

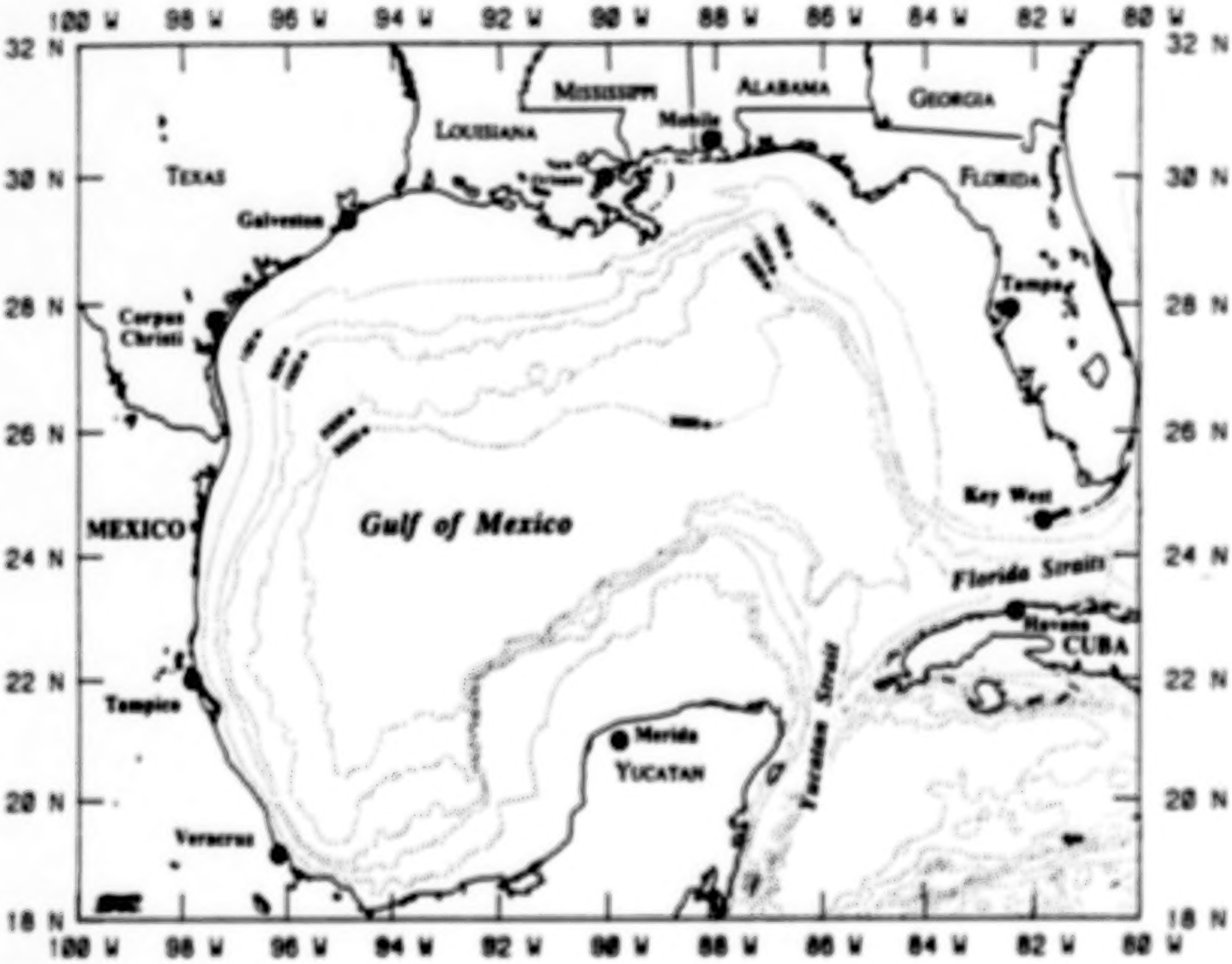

Figure 1a Gulf of Mexico regional map.

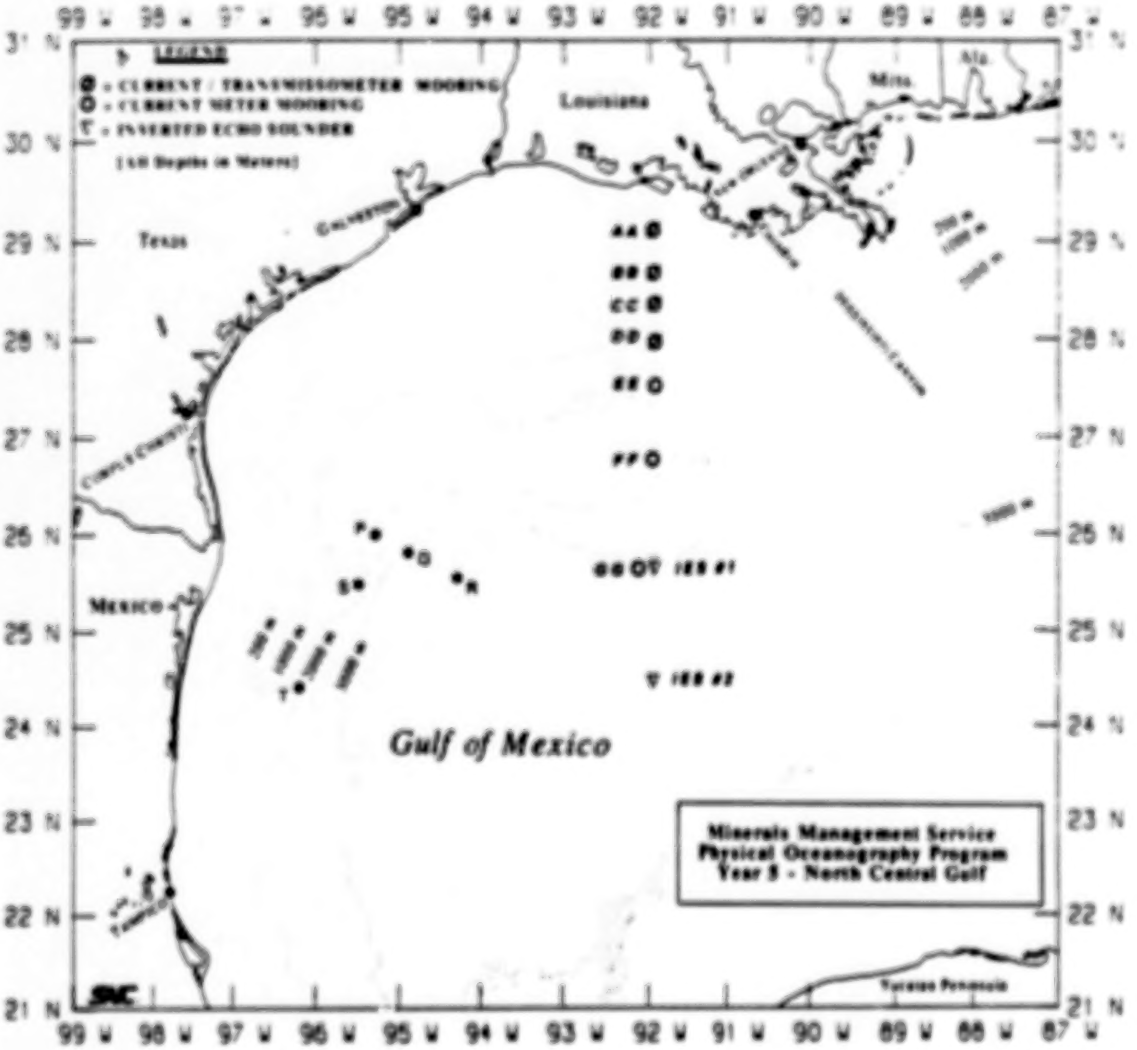

Figure 1b Map showing Year 5 mooring locations along 92°W. Year 3 Moorings (P-T) are shown as dots in the western Gulf.

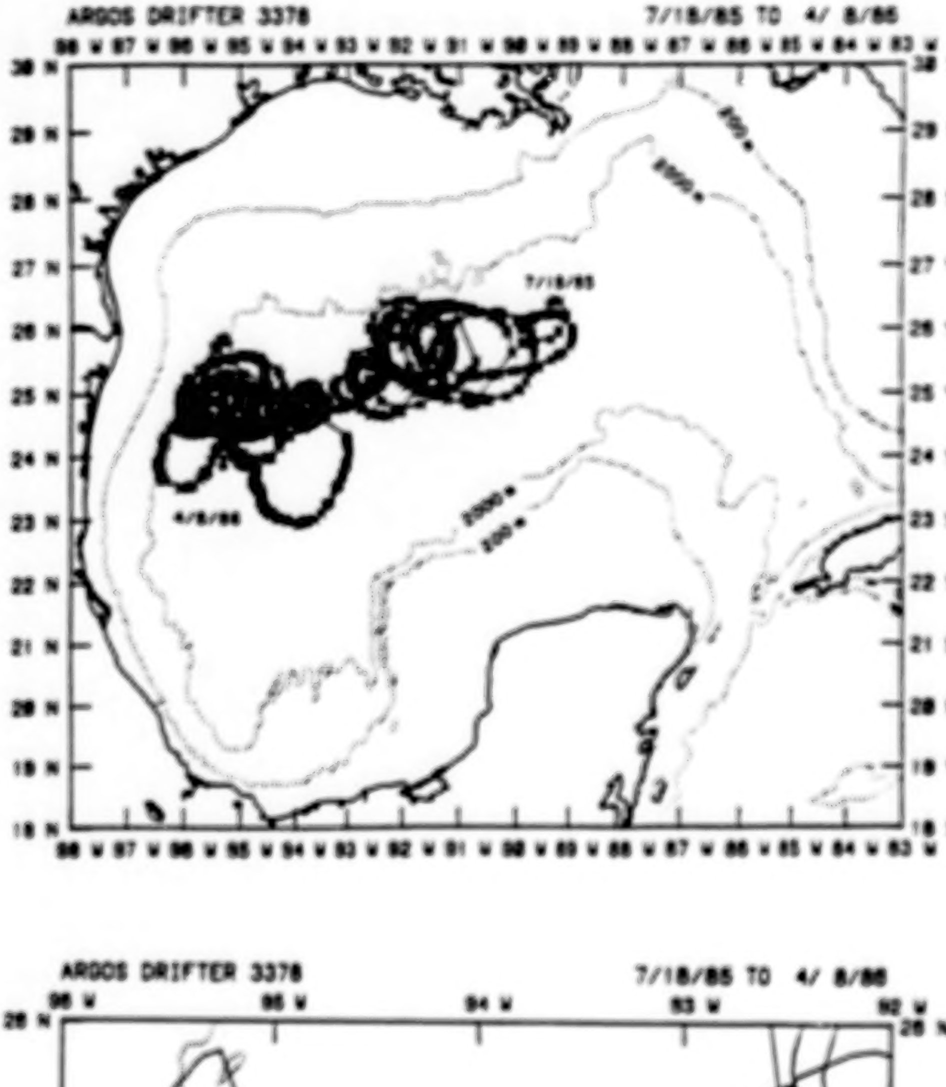

Figure 2 Trajectory of Buoy 3378 during Year 3 measurements (1985-86). (a) Complete trajectory (b) region of small diameter trajectories .

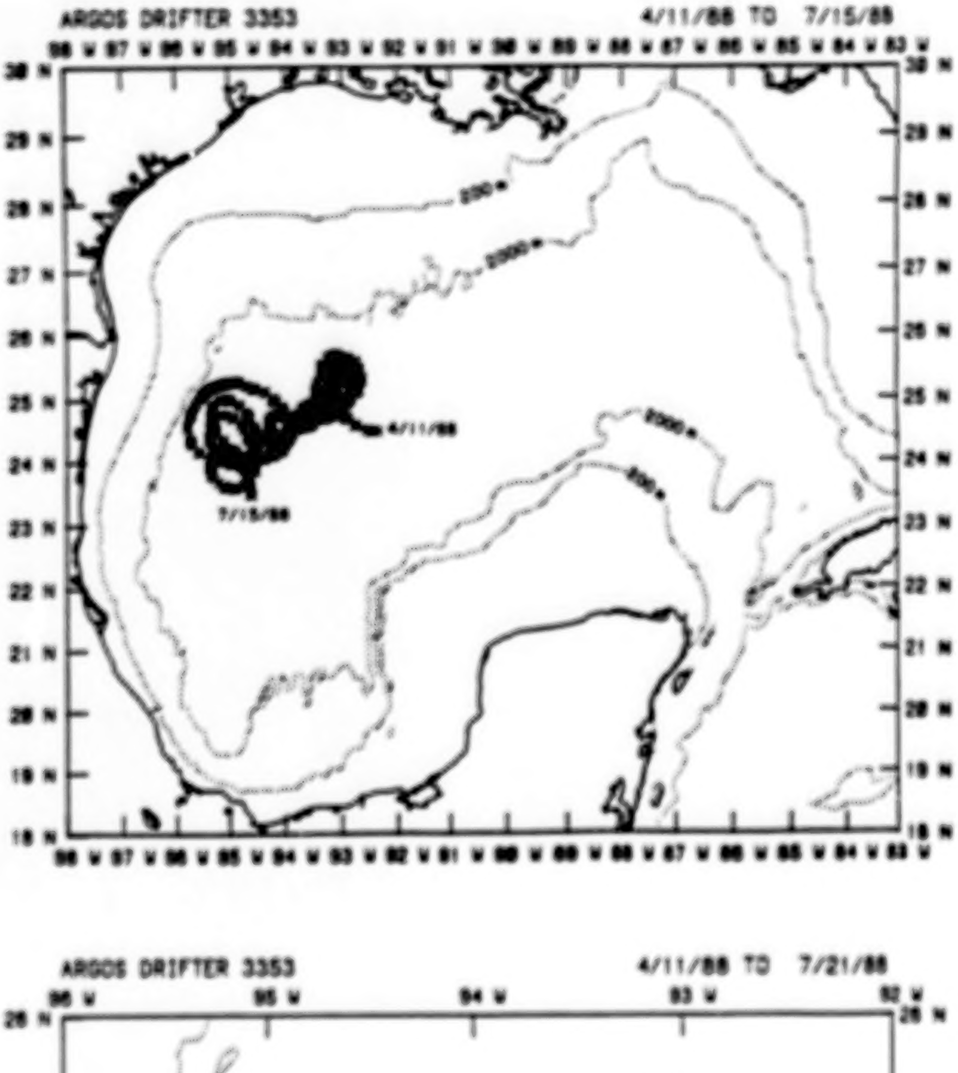

Figure 3 Trajectory of Buoy 3353 During Year 5 measurement (1987-present). (a) complete trajectory (b) region of small diameter eddies.

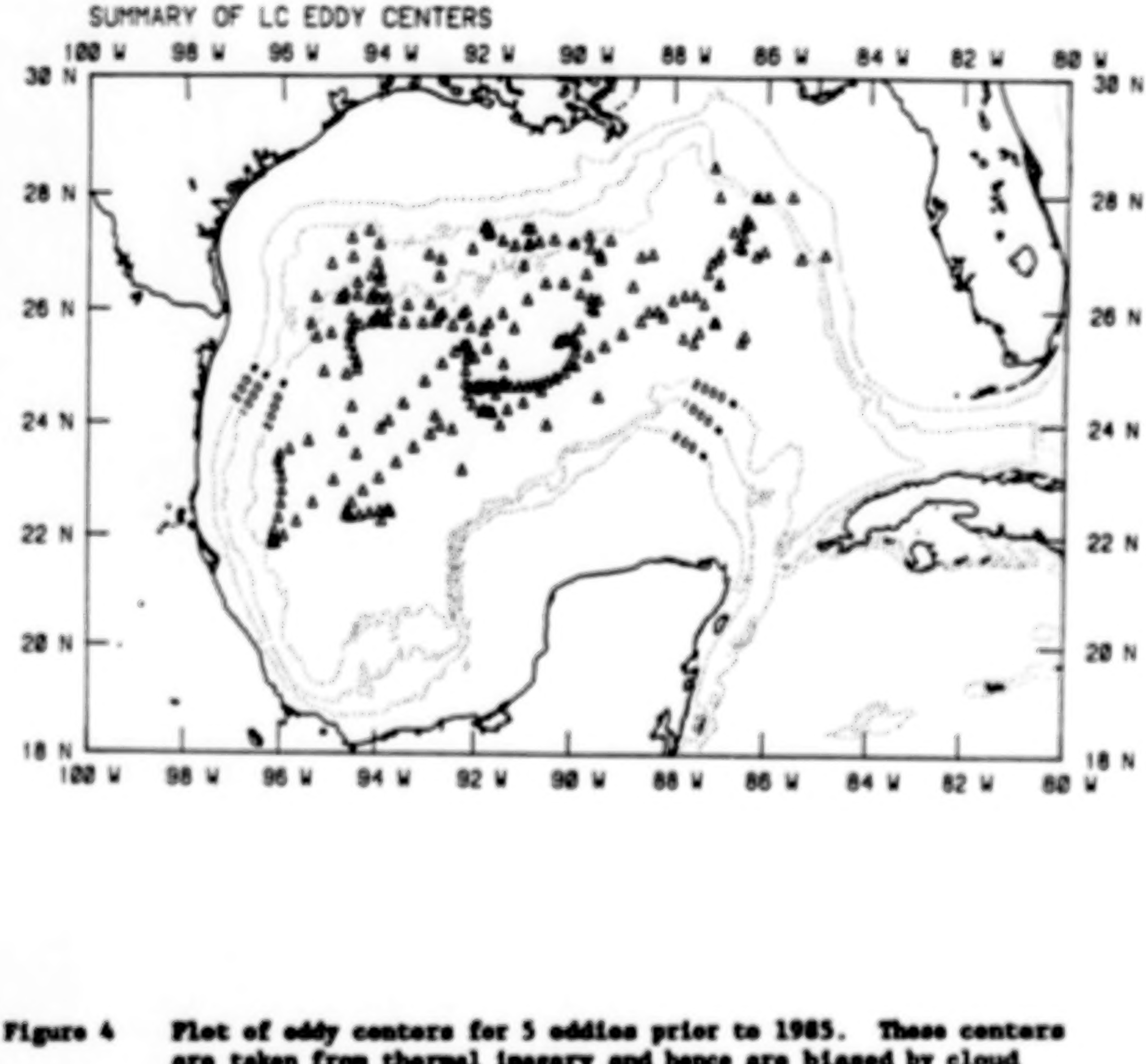

Figure 4 Plot of eddy centers for 5 eddies prior to 1985. These centers are taken from thermal imagery and hence are biased by cloud cover and warm sea-surface temperatures.

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ABSTRACT

MISSISSIPPI-ALABAMA SHELF MARINE ECOSYSTEMS STUDY: GEOLOGICAL CHARACTERIZATION

Second 1988
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Submitted to: Minerals Management Service
Gulf of Mexico OCS Regional Office
Environmental Studies Section

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GEOLOGICAL CHARACTERIZATION

R. REZAK AND W. SAGER

MAPPING

Field mapping effort was completed during the March mapping cruise. Bathymetry has been digitized in preparation for computer drawn bathymetric charts and side-scan sonar mosaics are being prepared for entering off-track bathymetric data on the charts. The side-scan records were photographed on a 35 mm continuous flow camera at the U.S. Geological Survey Laboratory in Palo Alto, CA. Three inch wide positive transparencies on Kronar film were made from the 35 mm negatives. Three inch wide prints were also made from the 35 mm negatives for use by the biologists on the R.O.V. cruise in late July.

Features recognized on the side-scan and subbottom records include:

1. Low topographic features including footprints
2. Moderate topographic features (low reefs?)
3. Major topographic features (pinnacles)
4. Pox (patchy, circular, strong returns with no relief)
5. Ridges (closely spaced outcrops along already defined features such as shorelines and scarps)
6. Widely spaced ridges (100 m or more)
7. Boulder Fields (look like Pox but have relief)
8. Wave fields (closely spaced sand or gravel waves)
9. Wrecks, sunken rigs or platforms

All of these features, except for the last two, appear to be relict Late Pleistocene to Early Holocene features related to a succession of stillstands as sealevel rose following the last Pleistocene low stillstand. The closely spaced ridges are most probably barrier island features such as truncated beach ridges or spits that were planed off during the following rise of sealevel. The may be accumulations of shell on an otherwise muddy bottom that could have resulted from the destruction of oyster reefs by wave action as sealevel rose. It is tempting to speculate that the history of the Mississippi-Alabama continental shelf is punctuated by a sequence of sealevel stillstands characterized by barrier islands similar to the modern Mississippi Sound, and that the sediments are mostly relict sediments that may have been slightly reworked during recent times. The 4.0 kHz subbottom profiles reveal foreset beds inclined toward the south in the area of the shelf break. These beds probably represent the Pleistocene delta of the Pascagoula River.

SEDIMENT TEXTURE

Textural analyses of sediment samples taken on transects "C", "M", and "D" do not yield any great surprises. The only departures from the published sediment distribution (MMS 85-0056) are at Station C-1 and Station D-3. Station C-1 is located close to the boundary of the St. Bernard Prodelta Facies and the Mississippi-Alabama Sand Facies and is a clayey, sandy silt. The station plots out in the sand facies but so close to the muddy prodelta facies the difference should be expected. The other apparent discrepancy , Station D-3 plots out in an are of silty sand but out analysis shows the sediment to be a gravelly sand. Here the answer is the proximity of the station to pinnacles that supply the coarser sediment in the form of skeletal material. Figure 1 shows the locations of the stations on the transects. Transect "C" is the westernmost, Transect "M" is in the middle and Transect "D" is the easternmost of the three. On each transect the shallowest station is #1 and the deepest is #4. Figures 2 through 7 give the grain size distribution for the composite grain size samples (a mixture of six replicate samples).

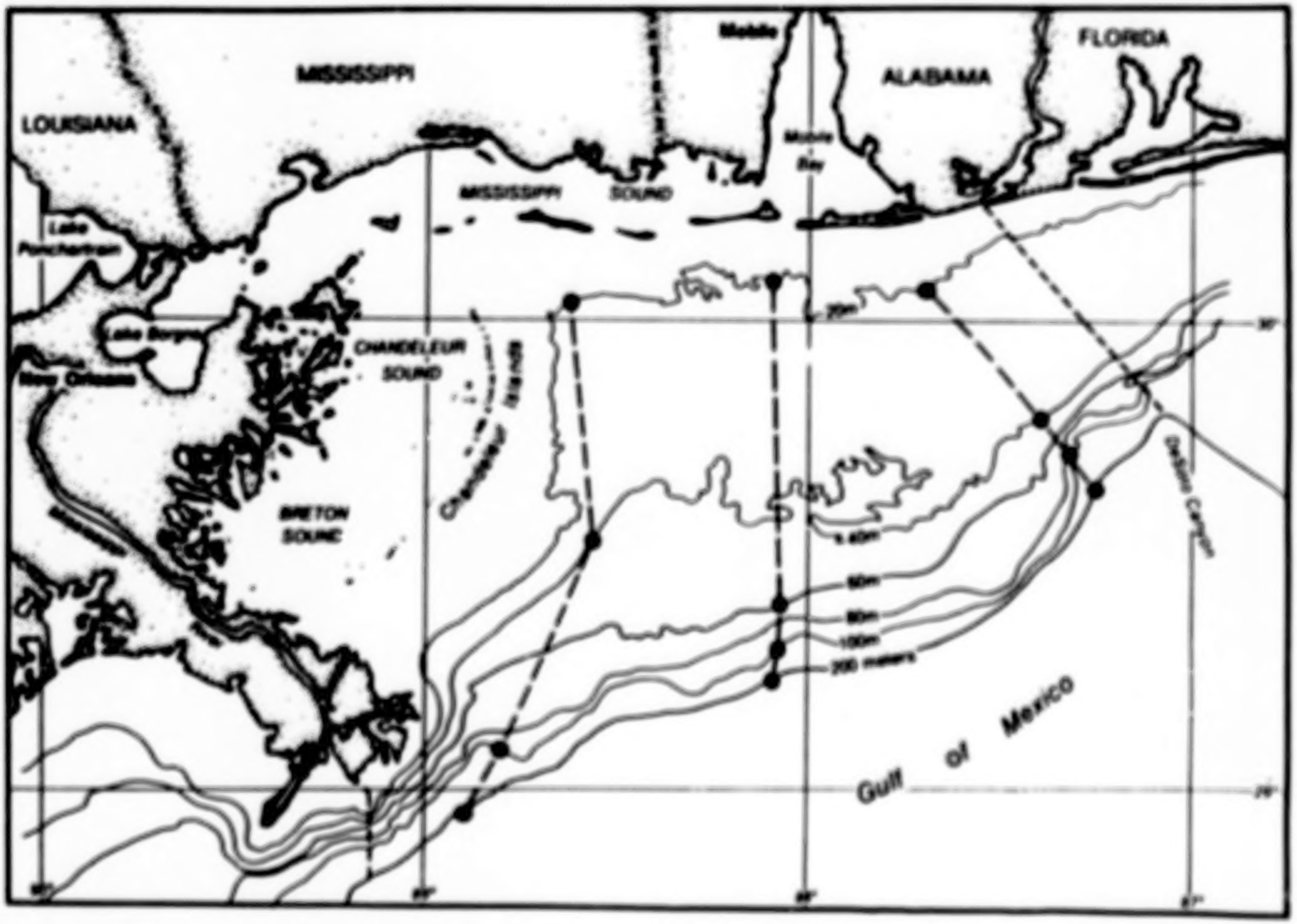


Figure 1. Locations of the stations on the transects.

Figure 2. **TRANSECT "C" COMPOSITE GRAIN SIZE**

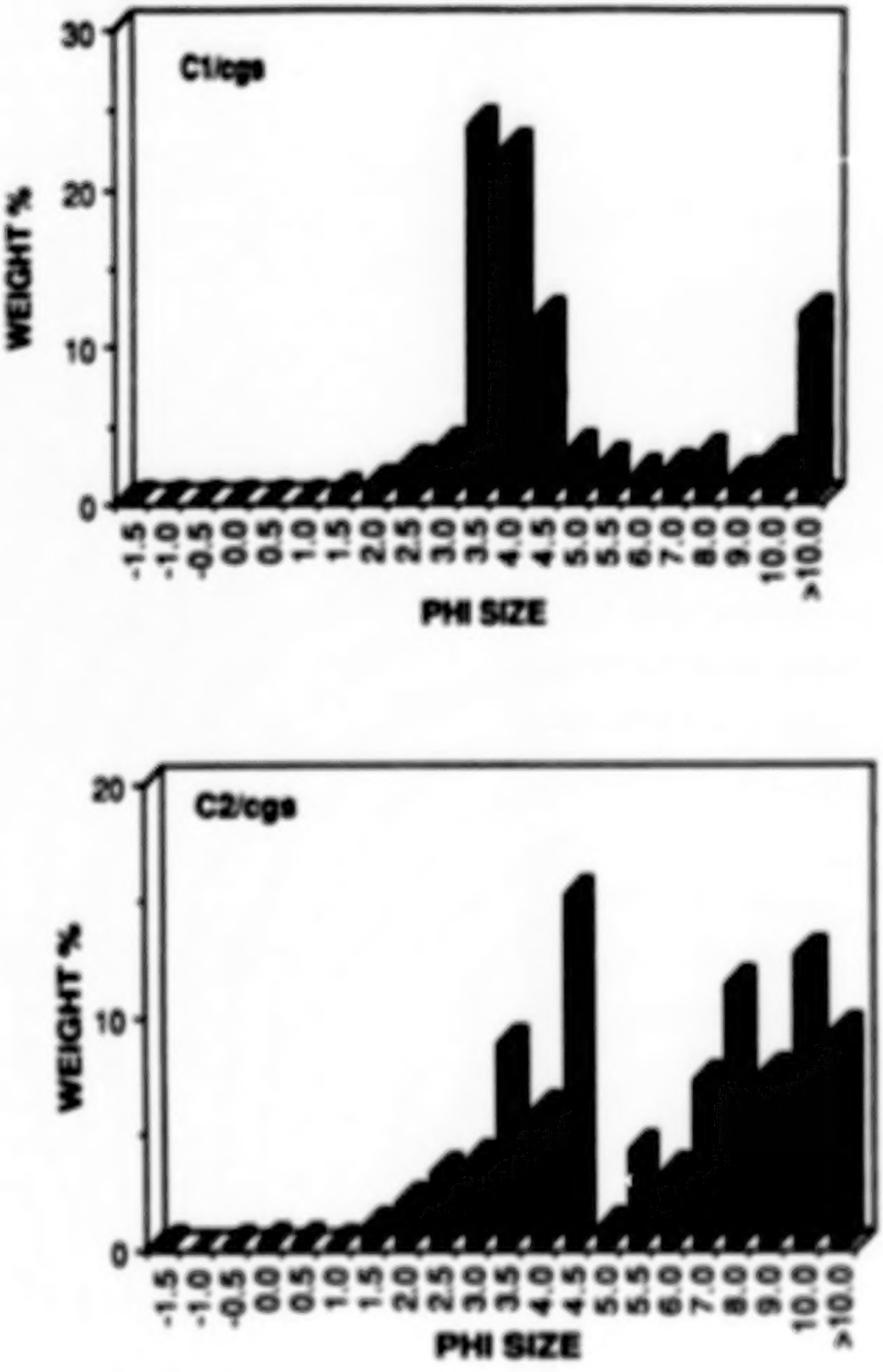
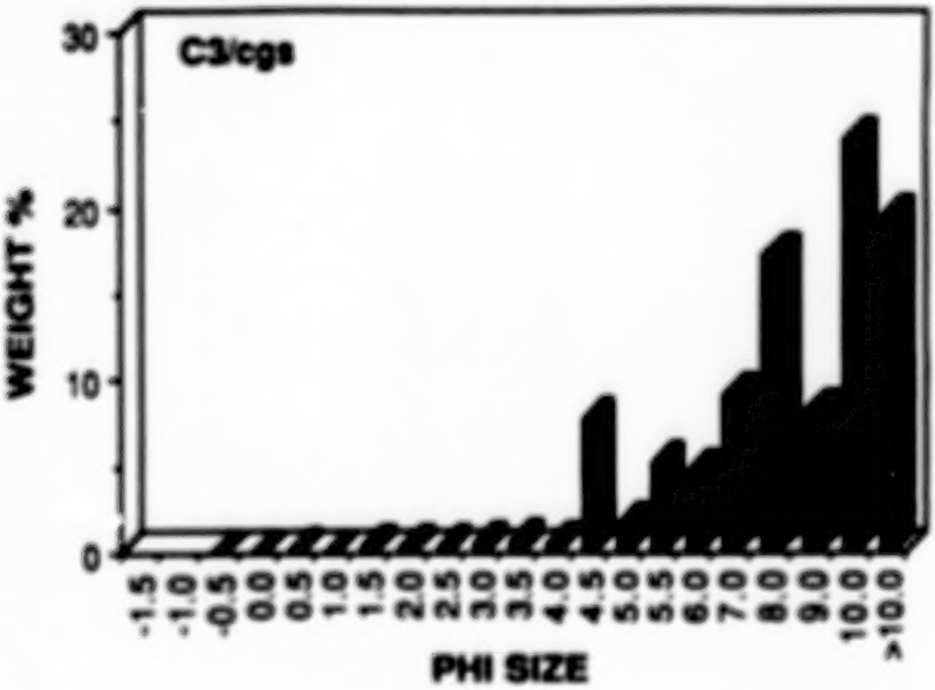


Figure 3. **TRANSECT "C" COMPOSITE GRAIN SIZE**



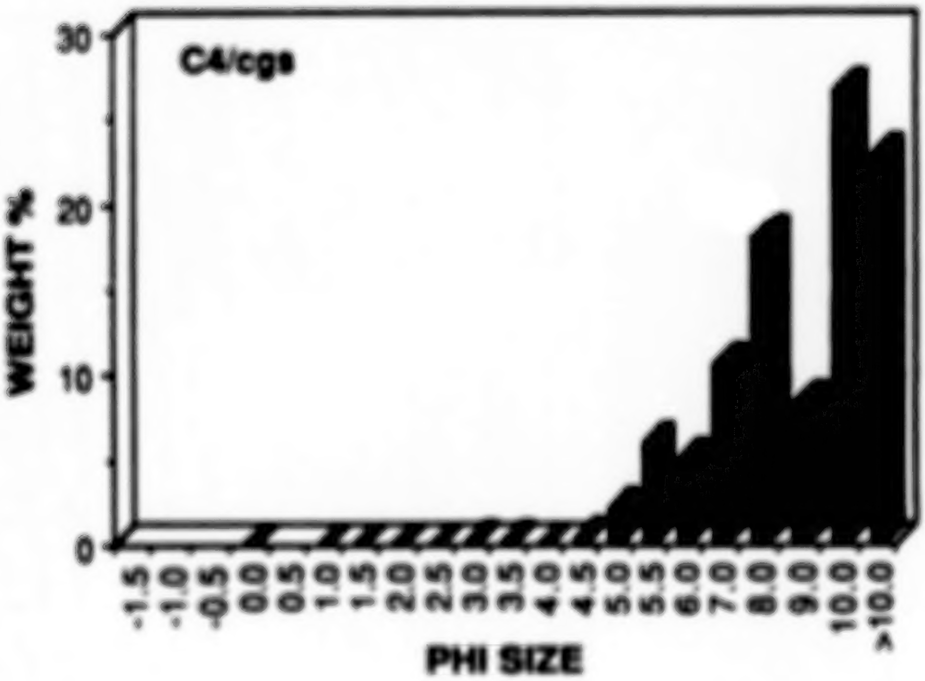


Figure 4. TRANSECT "M" COMPOSITE GRAIN SIZE

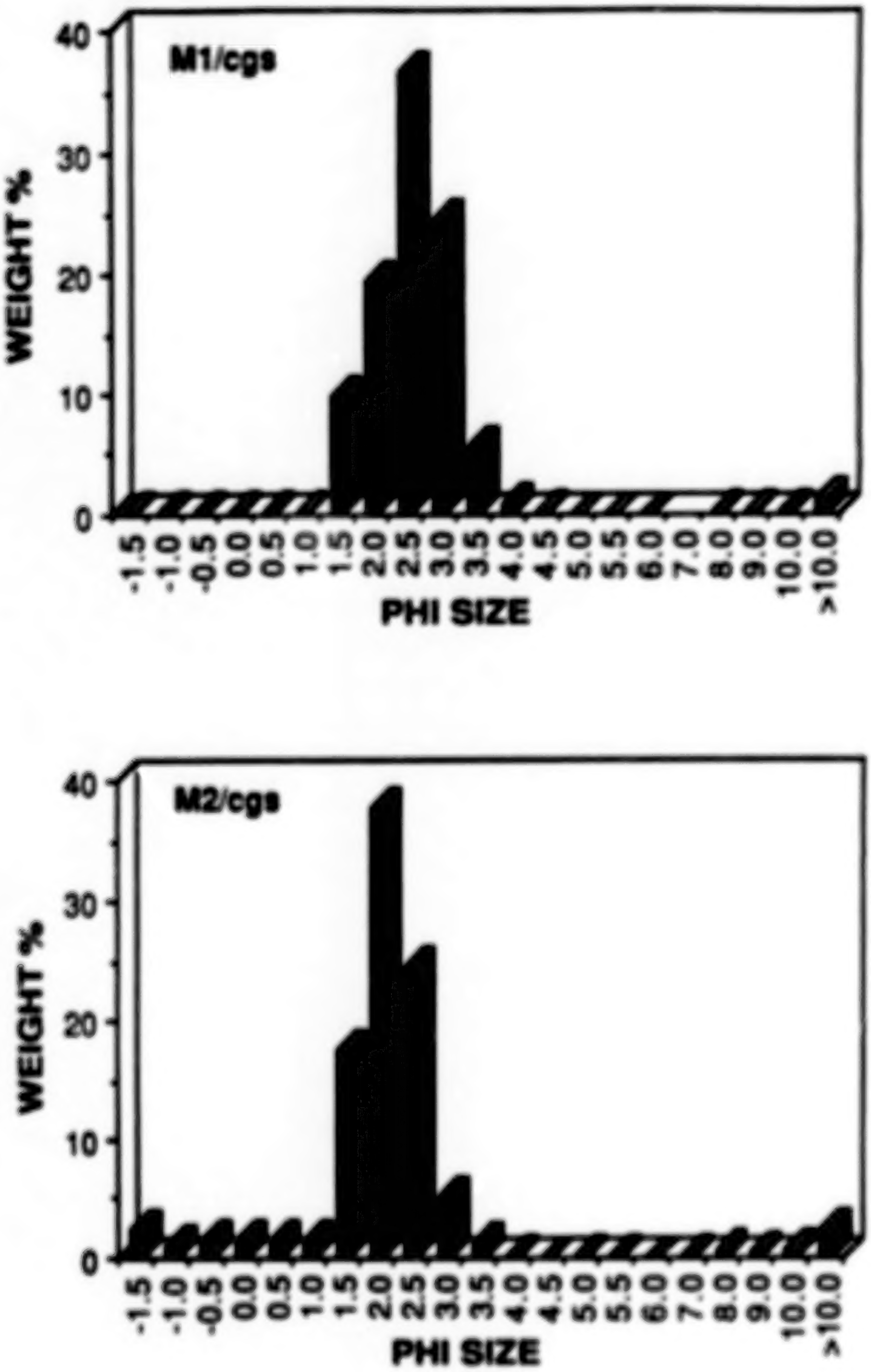
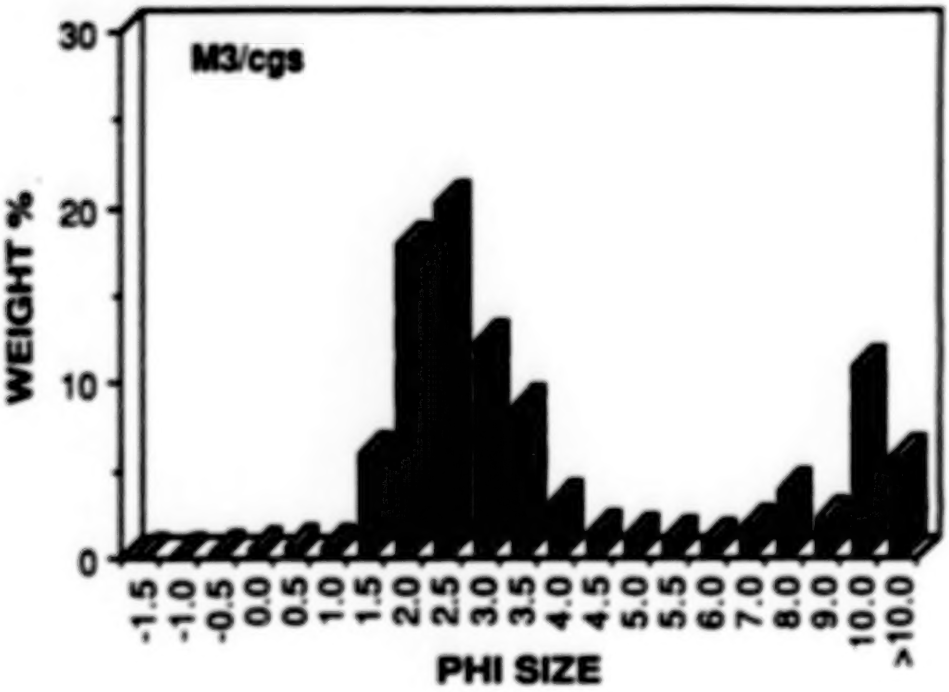


Figure 5. **TRANSECT "M" COMPOSITE GRAIN SIZE**



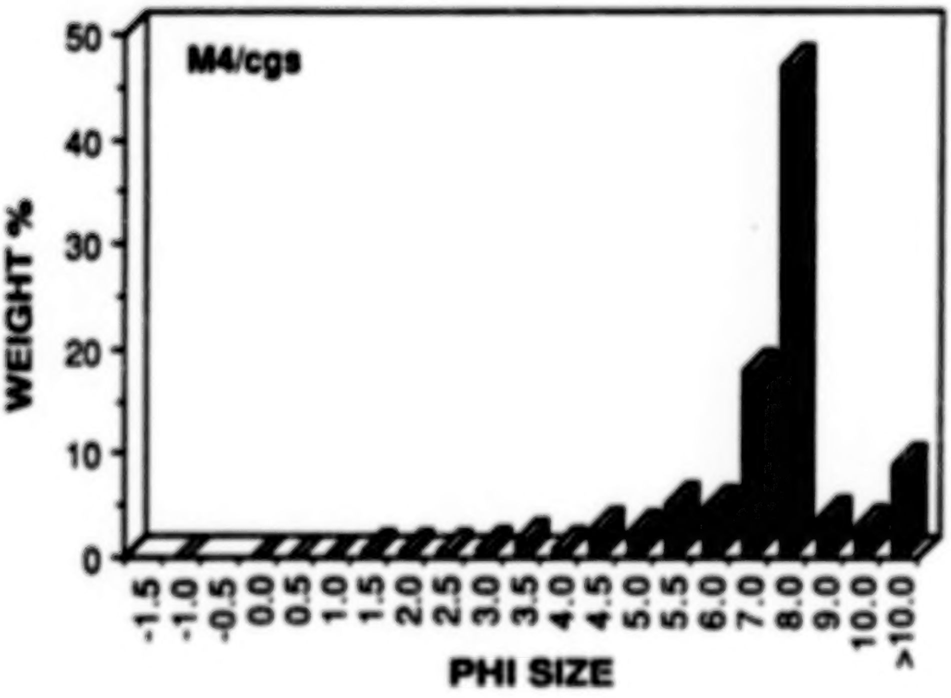
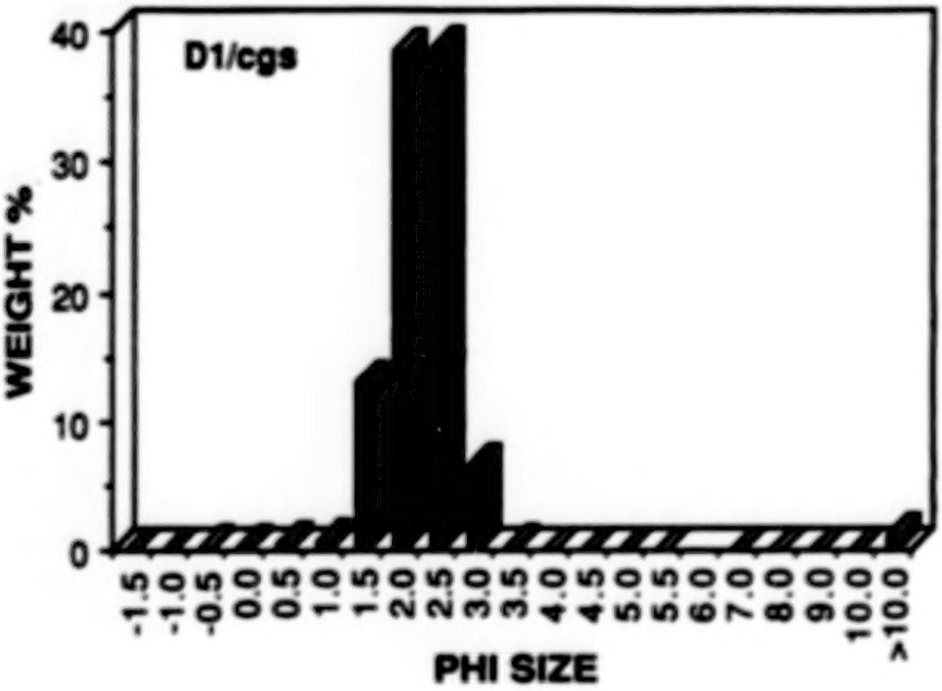


Figure 6. **TRANSECT "D" COMPOSITE GRAIN SIZE**



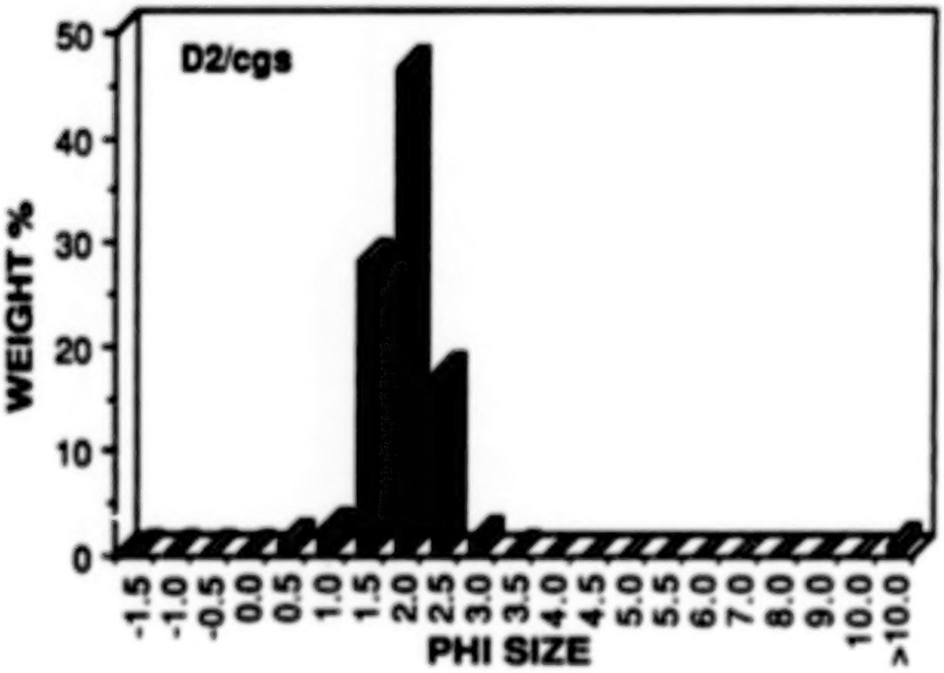
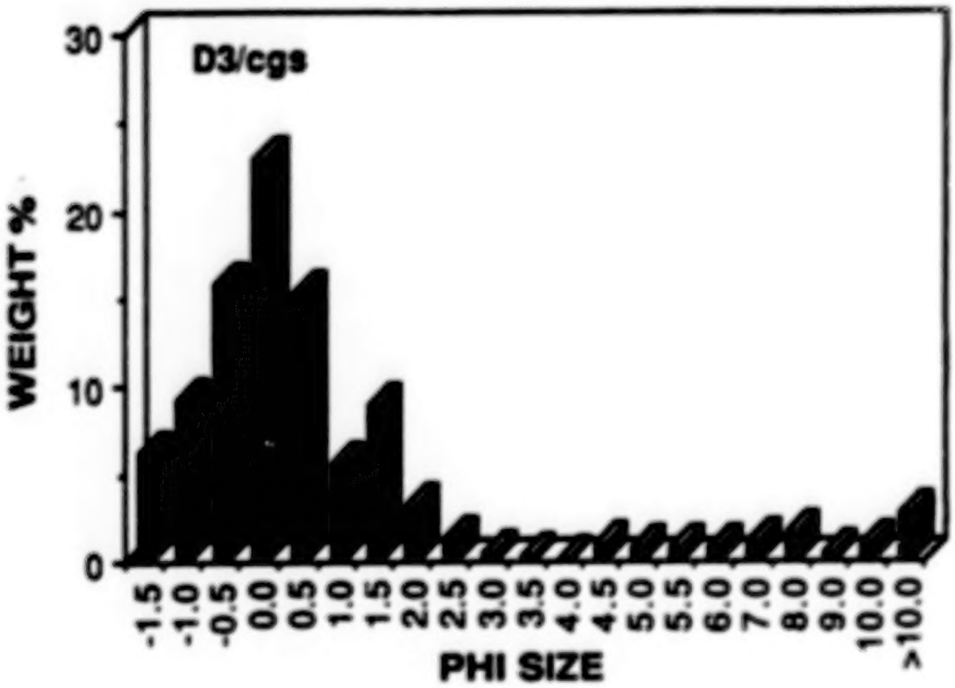
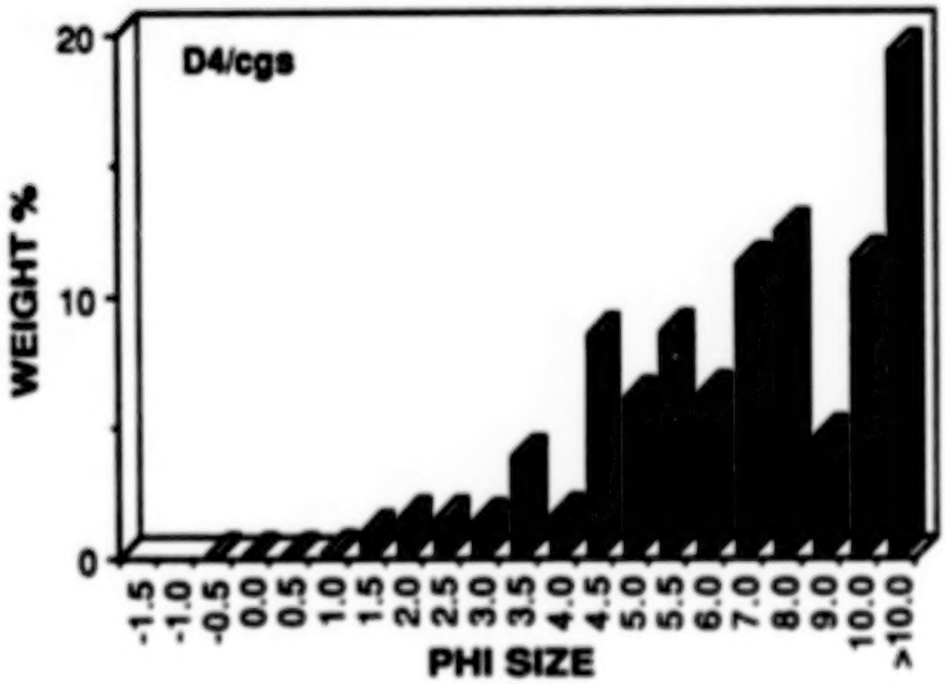


Figure 7. **TRANSECT "D" COMPOSITE GRAIN SIZE**





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ABSTRACT

SOCIOECONOMIC IMPACTS OF DECLINING OUTER CONTINENTAL SHELF OIL AND GAS ACTIVITIES IN THE GULF OF MEXICO

Second 1988
MMS Ternary Studies Meeting
July 14, 1988
Pensacola, Florida

Submitted to: Minerals Management Service
Gulf of Mexico OCS Regional Office
Environmental Studies Section

Submitted by: Mr. Lawrence McKenzie
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ABSTRACT

SOCIOECONOMIC IMPACTS OF DECLINING OUTER CONTINENTAL SHELF (OCS) OIL AND GAS ACTIVITIES IN THE GULF OF MEXICO (GOM)

BACKGROUND

This project is the third in a series of phased studies initiated by the Minerals Management Service (MMS) addressing the socioeconomic impact of outer continental shelf (OCS) oil and gas activities in the Gulf of Mexico (GOM).

Recent declines in the price of oil and gas have led to corresponding declines in OCS oil and gas activities. This recent price-related decline has contributed to increased unemployment and has created a general economic recession within coastal communities whose economic base is founded on oil and gas activities. The conditions resulting from the recent price-related decline provide a case study scenario upon which future socioeconomic impacts resulting from a resource depletion decline can be formulated.

STUDY AREA

The project study area encompasses portions of the states of Alabama, Louisiana, Mississippi, and Texas (Figure 1.). The 49 counties and parishes within the study area are located inshore of and inland from the central and western Gulf of Mexico coastal analysis areas. The study area covers thirteen (13) standard metropolitan statistical areas (SMSAs) (31 counties and parishes) and 18 counties and parishes outside SMSA boundaries.

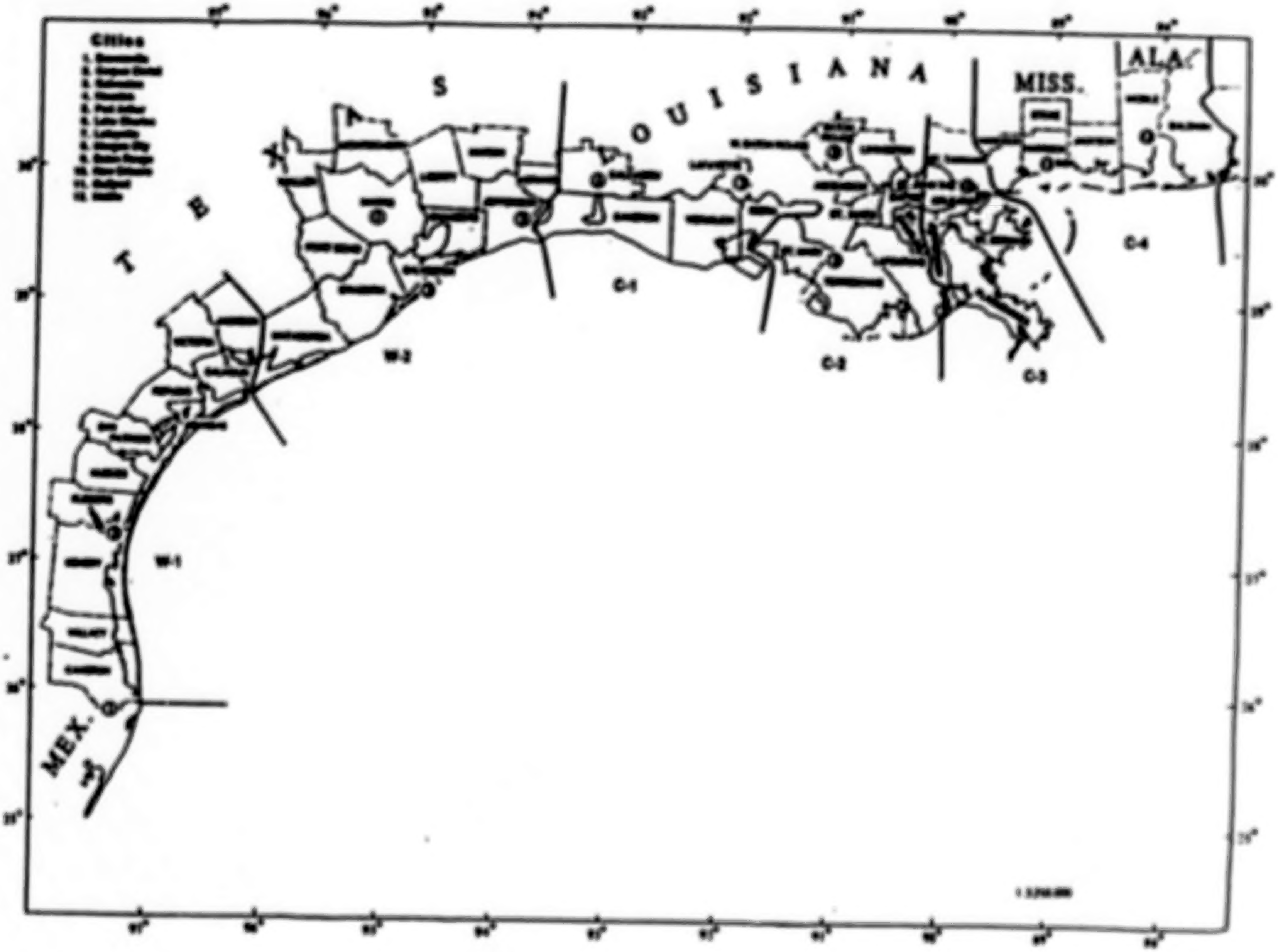


Figure 1. Study area map.

OBJECTIVES

The objectives established for the current project are:

1. to analyze the socioeconomic impacts of recent price-related declines in outer continental shelf oil and gas activities,
2. to formulate a set of conceptual cause-effect models that express the relationships between changes in OCS activities and select socioeconomic attributes, and
3. to identify and evaluate coastal resource development opportunities that could result from the utilization of in-place OCS-related infrastructure or environmental modification.

Each project objective is associated with a respective project task (Figure 2).

PROJECT ACTIVITIES

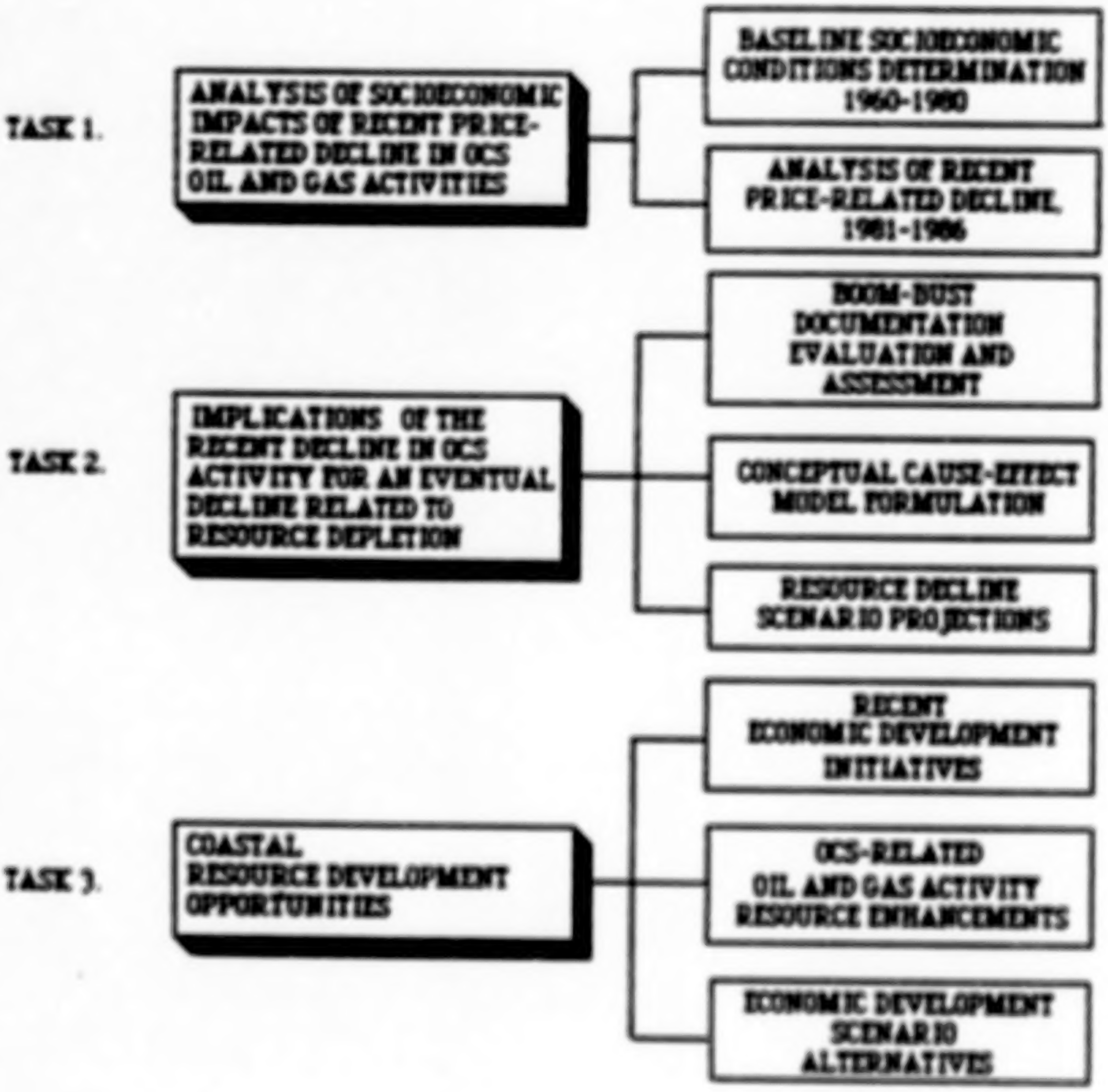
Project efforts have commenced on the initial portions of all three project tasks.

TASK 1

On task 1, efforts have been directed on the structure and content of databases which will be required to establish relationships between select socioeconomic attributes and oil and gas activity. Databases are required to document the period from 1960 to 1980 (the boom period) and 1981 to 1986 (the recent price-related bust period).

Two criteria were followed in the selection of measurable parameters to be used in the respective databases. First, data were to be obtained from available secondary sources. Second,

Figure 2.
SOCIOECONOMIC IMPACTS OF
DECLINING OUTER CONTINENTAL SHELF (OCS)
OIL AND GAS ACTIVITIES IN THE GULF OF MEXICO (GOM)


TASK 1.
ANALYSIS OF SOCIOECONOMIC IMPACTS OF RECENT PRICE-RELATED DECLINE IN OCS OIL AND GAS ACTIVITIES
BASELINE SOCIOECONOMIC CONDITIONS DETERMINATION 1960-1980
ANALYSIS OF RECENT PRICE-RELATED DECLINE, 1981-1986
TASK 2.
IMPLICATIONS OF THE RECENT DECLINE IN OCS ACTIVITY FOR AN EVENTUAL DECLINE RELATED TO RESOURCE DEPLETION
BOOM-BUST DOCUMENTATION EVALUATION AND ASSESSMENT
CONCEPTUAL CAUSE-EFFECT MODEL FORMULATION
RESOURCE DECLINE SCENARIO PROJECTIONS
TASK 3.
COASTAL RESOURCE DEVELOPMENT OPPORTUNITIES
RECENT ECONOMIC DEVELOPMENT INITIATIVES
OCS-RELATED OIL AND GAS ACTIVITY RESOURCE ENHANCEMENTS
ECONOMIC DEVELOPMENT SCENARIO ALTERNATIVES

the data had to be comparable over the time series specified and across the counties and parishes in the project study area.

The Minerals Management Service specified an extensive set of socioeconomic attributes to be used in the determination of baseline conditions (Task 1a)(Figure 3).

A review of available data to provide measurement of the attributes defined was initiated. Attention was directed to data available through the Bureau of Census and the Bureau of Economic Analysis. Each measurable parameter identified was subjected to the data criteria. Parameters which failed to comply with the established criteria were dropped from further consideration. Such parameters generally failed to meet the criteria due to changes in reporting or changes in classification from one decennial census to another. A final set of parameters was defined (DEMOGRAPHIC ATTRIBUTES MEASURABLE PARAMETERS Figure 4). The availability of each parameter from the 1960, 1970, and 1980 census is indicated by the letters "D", "I", and "E". A "D" indicates that a direct entry is possible from the census. An "I" indicates that the measurement required can be computed internally within the database from other direct measurement data. The "E" indicates data which are to be generated externally from the database.

Another set of data are required to characterize the recent price-related decline period from 1981 to 1986 (TASK 1b DATABASE Figure 5). Efforts are being made to structure this database in a manner where respective entries will consist of measurements common to the database for the period 1960 to 1980. If this effort is achieved, an extended time series will be available to perform the required statistical analyses.

Statistical relationships between the socioeconomic attributes and oil and gas activity are to be prepared. Available oil and gas activity data to be used in establishing these relationships are being identified. Attention is being given to overall oil and gas activity and to OCS oil and gas activity. Insight into the measures of oil and gas activity which are most likely to relate to socioeconomic attributes has been obtained from a review of previous research, particularly on an MMS sponsored project entitled Cumulative Socioeconomic Impacts of Oil and Gas Development in the Santa Barbara Channel Region: A Case Study. 1/.

1/ Centaur Associates, Inc., August 1984, Cumulative Socioeconomic Impacts of Oil and Gas Development in the Santa Barbara Channel Region: A Case Study, Pacific OCS Region, Minerals Management Service, U.S. Department of the Interior, Contract No. 14-12-0001-30026 (OCS Study MMS 84-0059).

Figure 3.

Baseline Socioeconomic Conditions Database, 1960-1980; Socioeconomic Attribute Categories

A. Demographic Attributes

1. Number of inhabitants
2. Population change
   - natural increase
   - net migration
3. Urban population
4. Age structure
5. Sex structure
6. Labor force participation rate
7. Employment and unemployment figures
8. Occupation structure
9. Income
   - per capita
   - median family
10. Educational attainment
11. Racial and ethnic composition
12. Residential mobility
13. Place of work/commuting patterns

B. Economic Structure and Activity

1. Data by 2 to 4 digit SIC categories

   a. Number of employees
   b. Payroll
   c. Number of establishments by employment-size class
   d. Value added/sales per employee

C. Local Government

1. Revenue by source
2. Expenditures by function

D. Community Services/Facilities

1. Education
2. Medical
3. Recreational
4. Transportation
5. Housing
6. Law Enforcement
7. Fire Protection
8. Public Assistance (not included in the above)

Figure 4.

SOCIOECONOMIC ATTRIBUTES, RESPECTIVE MEASURABLE PARAMETERS, AND DATA DERIVATION

		DATA DERIVATION CENSUS YEAR		
CATEGORY/ELEMENT IDENTIFIERS	MEASURABLE PARAMETER	1960	1970	1980
STATE CODE	FIPS - STATE	D	D	D
COUNTY CODE	FIPS - COUNTY	D	D	D
COASTAL ANALYSIS AREA	MMS DESIGNATION	D	D	D
DATA YEAR	DATE (YEAR)	D	D	D
DEMOGRAPHIC ATTRIBUTES				
1. NUMBER OF INHABITANTS	TOTAL POPULATION	D	D	D
2. POPULATION CHANGE	BIRTHS	?D	D	D
	DEATHS	?D	D	D
	NET MIGRATION	?D	D	D
3. URBAN POPULATION	URBAN POPULATION	D	D	D
4. AGE 5. RACE 11. GENDER	MALES (M)	D	D	D
	FEMALES (F)	D	D	D
	WHITE (W) MALES	D	D	D
	WHITE FEMALES	D	D	D
	NONWHITE (NW) MALES	D	I	I
	NONWHITE FEMALES	D	I	I
	≥ 65 MALES	D	D	D
	≥ 65 FEMALES	D	D	D
	< 18 WM	D	D	E
	< 18 WF	D	D	E
	< 18 NWM	D	E	E
	< 18 NWF	D	E	E
	18-64 WM	I	I	E
	18-64 WF	I	I	E
	18-64 NWM	I	E	E
	18-64 NWF	I	E	E
	≥ 65 WM	D	D	D
	≥ 65 WF	D	D	D
	≥ 65 NWM	D	I	I
	≥ 65 NWF	D	I	I
6. LABOR FORCE PARTICIPATION 7. EMPLOYMENT/UNEMPLOYMENT	PERSONS 16+ (14+'60)	I	I	D
	PERSONS IN LABOR FORCE	I	I	D
	CIVILIANS IN LABOR FORCE	I	I	D
	EMPLOYED	I	I	D
	UNEMPLOYED	I	I	D
	MALES 16+ (14+ in '60)	D	D	I

Figure 4.
SOCIOECONOMIC ATTRIBUTES, RESPECTIVE MEASURABLE PARAMETERS, AND DATA DERIVATION
(CONTINUED)

CATEGORY/ELEMENT	MEASURABLE PARAMETER	DATA DERIVATION CENSUS YEAR 1960	 1970	 1980
6. LABOR FORCE PARTICIPATION				
7. EMPLOYMENT/UNEMPLOYMENT. . .	MALES IN LABOR FORCE	D	D	I
(continued)	MALES IN CIVILIAN LABOR FORCE	D	D	I
	MALES EMPLOYED	D	D	I
	MALES UNEMPLOYED	D	D	I
	FEMALES 16+ (14+ IN '60)	D	D	D
	FEMALES IN LABOR FORCE	D	D	D
	FEMALES IN CIVILIAN LABOR FORCE	D	D	D
	FEMALES EMPLOYED	D	D	D
	FEMALES UNEMPLOYED	D	D	D
8. OCCUPATION STRUCTURE*	?	?	?	?
9. INCOME	FAMILIES (#)	D	D	D
	ANNUAL, MEDIAN FAMILY INCOME	D	D	D
	PER CAPITA INCOME	E	D	D
	INFLATION FACTOR	D	D	D
10. EDUCATIONAL ATTAINMENT. . .	MALES 25+	D	D	D
	MALES W/ 4 YEARS HIGH SCHOOL	D	D	D
	MALES W/ 4+ YEARS COLLEGE	D	D	E
	FEMALES 25+	D	D	D
	FEMALES W/ 4 YEARS HIGH SCHOOL	D	D	D
	FEMALES W/ 4+ YEARS COLLEGE	D	D	E
13. PLACE OF WORK	ALL WORKERS	D	D	D
	WORK IN COUNTY OF RESIDENCE	D	D	D
	PLACE OF WORK NOT REPORTED	D	D	D

* Employment by major industry group possible substitute for occupation structure.

D = DIRECT ENTRY
I = INTERNALLY COMPUTED
E = EXTERNALLY COMPUTED
? = QUESTIONABLE AVAILABILITY

Figure 5.
Recent Price-Related Decline Socioeconomic Database, 1981-1986;
Socioeconomic Attribute Categories

1. Employment by industry

2. Personal income by source

    a. Wages and salaries
    b. Interest and dividend
    c. Transfer payments

3. Population

    a. Population change
        - births
        - deaths
        - net migration

    b. Population composition
        - age
        - gender

4. Local government revenues by source

    a. Taxes
    b. Royalties
    c. Transfers from state and federal governments

5. Local government expenditures by function

TASK 2

The statistical relationships which will be identified under task 1 will be reflective of a short-term, price-related decline. Relevant "boom-bust" literature is expected to provide insight into the nature of longer-term "boom-bust" cycles. Findings from these long-term cycles will be used in the formulation of resource-decline scenario projections.

Efforts under project task 2 concentrated on the identification of "boom-bust" documentation. A key words search of several reference files has been completed.

The search of the Department of Energy and Dissertation Abstracts databases produced 300 titles. An additional 1,000 pages of references were collected from a review of:

- Applied Science & Technology Index,
- Industrial Arts Index,
- International Index to Periodicals,
- Public Affairs Information Service Bulletin,
- Reader's Guide to Periodical Literature,
- Social Sciences & Humanities Index,
- The Humanities Index, and
- Social Science Index.

Other references have been obtained from contemporary literature on the topic of "boom-bust" phenomena. Throughout the search, attention was directed to the documentation of related scenarios, especially those involving some form of mineral extraction, which have been subjected to long-term "bust" or decline conditions.

TASK 3

The goal of task 3 is to evaluate alternative economic opportunities that are available in the coastal areas of the Gulf of Mexico and that can be developed to substitute for oil and gas activities as a source of employment and income. Activities being performed under this task include:

- documentation of OCS-related oil and gas infrastructure and environmental modifications and of the existing oil and gas work force, and

- identification of alternative economic development initiatives which have evolved during the recent price-related decline period.

Documentation of infrastructure, environmental modifications, and work force is being obtained from reports prepared during the "boom" period. These reports describe the stages of development and the facility and labor requirements associated with the development of offshore oil and gas activities.

A literature search was conducted to identify recent economic development initiatives. The search centered on major newspapers and business journals published in the study area and on articles of a regional nature from economic journals and Congressional reports.

The activities accomplished provide the base from which further analyses will be performed on sequential phases of the project.

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ABSTRACT

TASK I AND TASK II STUDY RESULTS IN THE REEVALUATION OF CULTURAL RESOURCES MANAGEMENT ZONE I AND THE DEVELOPMENT OF AND INTERPRETATIVE FRAMEWORK FOR MAGNETIC ANOMALIES AND SIDE-SCAN SONAR FEATURES

Second 1988
MMS Ternary Studies Meeting
July 14, 1988
Pensacola, Florida

Submitted to: Minerals Management Service
Gulf of Mexico OCS Regional Office
Environmental Studies Section

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DRAFT - TERNARY REPORT
July 1988
Pensacola, Florida

Task I and Task II Study Results in the Reevaluation of Cultural Resources Management Zone I and the Development of and Interpretative Framework for Magnetic Anomalies and Side-Scan Sonar Features

by

Ervan G. Garrison and Charles P. Giammona

Abstract

The analyses of data developed in the course of the Task I and II study have been completed. The objectives relative to the reevaluation of Cultural Resources Management Zone I and the development of an interpretative framework for instrumental survey data have been met. Task I has expanded the existing data base on shipwrecks in the northern Gulf of Mexico to 4,000 vessels over the historic period. This data exists in fully computerized digital formats suitable for mainframe (VMS) or PC (MS-DOS) environments. Task I has evaluated factors affecting the location and preservation of shipwrecks. It has identified areas of differential probabilities for shipwrecks based on spatial analyses of the data. It has correlated these results with the preservation potential for various areas of the northern Gulf of Mexico. Dividing the northern Gulf into western, central and eastern areas, the study identified clear trends in the observed and expected location, distribution and preservation of shipwrecks. Task II results have been equally good. Re-survey of all or large portions of three lease blocks has allowed the characterization of instrumental signatures of magnetic and side-scan sonar features. A clear partition of the data follows expectations for blocks that have had oil and gas development versus blocks without oil and gas development. Specifically, the developed block (GA313) had a higher number of both magnetic anomalies and side-scan sonar contacts. These were clearly related to development activities. Undeveloped blocks (2) provided few side-scan sonar features (none in the case of GA332) and significantly fewer magnetic anomalies, particularly in the case of GA324. The number of magnetic anomalies in the undeveloped block, GA332, was slightly higher than GA324, but this was believed to be due to the location of a large portion of GA332 in an active shipping fairway and near an anchorage site.

Late in the study, the opportunity to examine a historic shipwreck site in the Chandeleur Islands has presented an important case to develop further data on instrumental signatures of such sites and to evaluate Task I study expectations as to factors affecting the type and preservation of shipwrecks in this area. The Chandeleur Island shipwreck represents the first chance to develop such data for the northern Gulf of Mexico, east of the Mississippi River. Taken in concert with the results of the Task I and II study, evaluation of this site can provide significant data for the instrumental characterization of shipwrecks in this area as well as provide data on the distribution and preservation of such shipwrecks.

THE CHANDELEUR ISLAND SHIPWRECK
SIGNIFICANCE TO PRESENT TASK I AND TASK II STUDIES
AND RECOMMENDED LEVEL OF EFFORT

I. Significance to Task I Study: Reevaluation of Cultural Resources Management Zone I (CRMZI)

  A. The Task I study specifically examined:

    1. The location and distribution of shipwrecks, spatially and temporally,

    2. Factors affecting this distribution, and

    3. Factors affecting the preservation of these shipwrecks.

  B. The significance of the Chandeleur Island shipwreck:

    1. It allows an evaluation of the type and age of a central/eastern planning Gulf shipwreck for the first time.

    2. It allows the evaluation of the preservation potential of an early Colonial shipwreck in the central/eastern planning area for the first time.

    3. Data from a reconnaissance-level study of the Chandeleur Island shipwreck allows a direct test of assumptions used to reevaluate CRMZI, e.g., expectation as to the age of the shipwreck, type of vessel, and preservation in this area.

    4. Data to evaluate the predictive value of the shipwreck data file developed by Task I.

II. Significance to Task II: Develop an Interpretative Framework for Magnetic Anomalies and Side-Scan Sonar Contacts

  A. The Task II study has restudied three lease blocks to characterize:

    1. Magnetic anomalies with no associated side-scan sonar features.

    2. Magnetic anomalies with associated side-scan sonar features.

    3. Side-scan sonar features with no associated magnetic anomalies.

  B. The significance of the Chandeleur shipwreck:

    1. It allows the instrumental characterization of a shipwreck as to magnetic and side-scan features.

2. It allows an easy opportunity to provide systematic ground truth data to correlate to the instrumental data, e.g., magnetic signatures of cannon, ballast, lead sheathing, side-scan sonar signatures of ballast, cannon, etc.

3. It provides the first such opportunity in the central/eastern planning area.

III. Overall Significance of Chandeleur Island Shipwreck to Present Study

A. The instrumental survey of the Chandeleur Island will provide important data to better characterize historic shipwrecks.

B. The ground-truthing and reconnaissance level archaeological study, to include mapping and recovery of datable artifacts or structural materials, will provide important data to test the results of the Task I study. These include:

    1. Expectations of vessel type and age for the central/eastern planning area.

    2. Preservation potential for such a shipwreck within this area.

C. The present study requires the accomplishment of both A. and B. to expand existing data for the instrumental discrimination of historic shipwreck materials and the assessment of preservation potential for a historic shipwreck in this area.

Summary

The Chandeleur Island shipwreck represents a first opportunity to obtain scientifically acquired data on a historic shipwreck in the central/eastern planning areas. Present Task I and Task II models are based primarily on western planning area data. The Chandeleur Island shipwreck allows an effective, easy test of Task I and II hypotheses concerning instrumental characterization and shipwreck preservation potential for this area. To do this requires:

1. A magnetic and side-scan sonar survey of the wreck.

2. Ground-truthing and reconnaissance level survey of the site.

3. Mapping and recovery of a small suite of identifiable and chronologically datable material from the site.

The results of this study will immeasurably add to the strength of the Task I and Task II study results in recommending realistic survey requirements in a reevaluated CRMZI.

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